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The new British deterrent: strategic planning and domestic political implications.

Cummings, Kevin P.

Monterey, California. Naval Postgraduate School

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THESIS

THE NEW BRITISH DETERRENT:
STRATEGIC PLANNING AND DOMESTIC
POLITICAL IMPLICATIONS

by

Kevin P. Cummings

October 1982

Thesis Advisor: D. S. Yost

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The New British Deterrent: Strategic Planning and Domestic Political Implications

by

Kevin P. Cummings
Lieutenant Commander, United States Navy
B.A., University of Notre Dame, 1969

Submitted in partial fulfillment of the
requirements for the degree of

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from the

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October 1982

ABSTRACT

The British Government announced its intention in July 1980 to modernize its strategic nuclear deterrent with the deployment of the Trident I (C4) submarine-launched ballistic missile. The MIRVed Trident missile will have significantly increased capabilities of range, payload and target numbers. It also represents an enormous expense for the British to bear and high political and military opportunity-costs for capabilities which may not be vital to an effective and credible national strategic deterrent. The political difficulties likely to be encountered in bringing the Trident program to fruition may portend the loss of all British strategic capability, while resulting conventional weapons reductions may even contribute to lowering the threshold of aggression in Western Europe and increasing the likelihood of the threatening circumstances a nuclear deterrent is designed to avoid. Alternative strategic options, such as Polaris or Poseidon SLMBs or cruise missiles, should be explored to achieve the strategic stability and guarantee which the British seek.

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I. INTRODUCTION

On 15 July 1980, Her Majesty's Government published the texts of letters exchanged between the President of the United States and the British Prime Minister "providing for the United Kingdom to buy from the United States the Trident weapon system, comprising Trident I ballistic missiles and supporting components for a force of British missile-launching submarines to replace the present Polaris-equipped force." [Ref. 1: p. 1] This long-awaited announcement marked the beginning of the end in the tortuous decision-making process of the British government over the controversial question of whether or not to maintain a strategic nuclear deterrent into the 21st Century. It is unlikely, however, to be the final word on the subject. It remains a monumental task to sustain the political resolve necessary over the next decade to translate this decision into a deployed strategic capability.

The problem of insuring external security has always been the primary task of states. The "raison d'etre" for British defense policies is "to safeguard the sovereignty of the United Kingdom and the British way of life under a democratically elected government." [Ref. 2: p. 21] Without security, all the other administrative and social functions assumed by contemporary governments are for nought. Defense is inextricably linked to national security and any action affecting

one must necessarily act on the other. The decision of the British government to attempt to maintain an effective independent strategic nuclear deterrent could be of paramount significance in shaping that nation's course over the next several generations. It will affect the sum of international security calculations especially in the European theater, and could also have substantial domestic repercussions that may, in the long run, have a greater impact than any other single facet of the decision.

The strategic environment is not static. The international situation that influenced the British decision to seek Trident changes continually. It is flexibility and fluidity which seem to be the principal constants in domestic politics, alliance relationships and military technology as well as strategic planning.

The history of the strategic arms race over the past thirty years reveals the tremendous amount of energy and uncertainty that has been always present. Weapons systems were bought even as they were being overwhelmed by new technologies; international alignments changed; domestic political coalitions shifted; national character and resolve were redefined. The examples are almost endless, but the final conclusion remains unchanged. No political decision of the importance, complexity and controversy as that surrounding the continuation of a strategic nuclear deterrent force will ever be completely immutable.

It is interesting that the first open and relatively frank consideration in twenty years of the role of the ballistic missile submarine in British strategic planning has been brought about by factors of material fatigue and technical obsolescence in that very force. This discussion will touch on strategic traditions in Britain since the Second World War, and how any changes will affect Anglo-American relations and relations with neighboring European countries, particularly France and West Germany.

The principal objective of this thesis and its accompanying research is to elucidate the rationales, expressed and implicit, for the British decision to acquire the Trident ballistic missile system with its attendent strategic capabilities. From this analysis, personal conclusions are then offered as to the soundness of the decision and the likelihood that it can be brought to successful fruition, as well as other alternative strategic options which might yet remain open to exploration. The study of this complex and multifaceted decision provides insights into the decision-making apparatus of the British government and of its allies, and enhances our understanding of the "pulling and hauling" of competing priorities and special interests that constitute the reality of politics.

The ability of the British government to accomplish the modernization of its independent strategic nuclear deterrent force may well be measured in the opportunity cost to other

important political functions including both conventional arms and social programs. This hypothesis, if true, could portend serious consequences for the United Kingdom and might even serve to promote indirectly the conditions of international instability which the Trident system under British control is designed to guard against.

Chapter II provides an overview of the historical development of the British strategic nuclear deterrent. It examines political rationales for its existence and considers the premises behind its potential employment. The military hardware that has been the embodiment of the deterrent threat is reviewed with particular emphasis given to the state of current operating units and the timing requirements of the British decision to purchase Trident.

Chapter III considers the various weapons systems and their launch platforms proposed as replacements for Polaris in terms of their utility to a medium power such as Britain. It also reviews the arguments about relinquishing the nuclear deterrent capability completely.

Chapter IV explores the background and dynamics of the Conservative government's decision to proceed with the procurement and deployment of the Trident I (C-4) ballistic missile as a follow-on to the sea-based Polaris deterrent force.

Chapter V deals with the domestic political variables of maintaining and modernizing an independent strategic nuclear

deterrent. It considers the advantages and disadvantages accruing from each and analyzes the key factors in the Brisith government's decision to opt for Trident.

Chapter VI provides final reflections and concluding observations about the Trident decision and its future viability. This section will present the author's right perception of the role the British strategic nuclear deterrent will play in influencing the strategic balance, European cooperation and security and the stability of domestic British politics.

II. THE CONTEMPORARY STATUS OF THE BRITISH NUCLEAR DETERRENT

In October 1977, Ian Smart, then Deputy Director of the Royal Institute of International Affairs (Chatham House) provided the first authorized analysis of the future of the British strategic nuclear deterrent in the 21st Century. In his article "Beyond Polaris" [Ref. 3: p. 557] Smart argued that for reasons of impending material obsolescence and the long-lead times in modern weapon system procurement requirements, a decision would have to be made in the early 1980's - preferably in 1980 - on whether to continue maintaining a strategic deterrence force after 1995. Not doing so would allow the credibility of the existing Polaris-equipped submarines to gradually decline without any positive judgement having been made about the utility of such action. Smart focused primarily on the technical problems which required resolution. His purpose was "to encourage and, as far as possible, to inform a policy debate - not to conduct it." [Ref. 4: p. iii]

Smart's analysis heralded the first public debate over the function and future of the British deterrent since the late 1950's and early 1960's when hundreds of thousands of anti-nuclear protestors had been mobilized by the Campaign for Nuclear Disarmament (CND), and the question of nuclear weapons had been at the center of British politics. The

divisiveness of the issue had placed enormous strains on the internal structure of the British Labour Party, and politicians had proved especially wary of raising it since. [Ref. 5: p. XIV] Additionally, the nuclear force has done little to draw attention to itself. It has been cheap in terms of operating expenses, consuming less than 1.5% of the Defense budget and 0.8% of defense manpower annually. [Ref. 5: pp. 18 and 21] In the absence of a superpower confrontation or any other international crisis of the first magnitude involving Great Britain, there has been little likelihood that the force would be actually employed. The Head of Policy Studies at the Royal Institute of International Affairs, Dr. Lawrence Freedman, says:

> In the absence of major decisions to be taken on nuclear weapons policy, other issues came to dominate political debate. The nuclear issue was kept hidden, with little official comment on the matter, and secrecy unusually tight even by British standards. [Ref. 5: p. XIV]

One feature that must be clearly understood in considering the Polaris replacement question is the unique "British strategic culture." Specifically this tends to be "a reluctance to engage in theoretical analysis or to articulate the major assumption of British strategy." [Ref. 7: p. 1] What this means in terms of policy inquiry is that one must look at what the British do, rather than what they say, to develop an appreciation for their strategic thinking. The British have an almost closed system of defence policy-making compared to the other Western democracies. Decisions are

arrived at in secret, with little public attempt made to justify them. British defense policy is arrived at in an evolutionary manner where a "very small group of men in the Ministry of Defence and Cabinet formulate policy, which is 'imposed' upon the services, the opposition in Parliament, and the party of the Prime Minister." [Ref. 8: p. 2] Robin Ranger describes this salient trait of British politics in commenting on the Trident decision:

> The British have undertaken a major expansion of their strategic nuclear forces without formally admitting they are doing so, and without providing any political or strategic justifications remotely comparable to the importance, and cost, of this action. The result has been almost a caricature of British strategic debate, avoiding logic, regarding technical data as unimportant, conducted in symbolic phrases, and mostly in secret. [Ref. 7: p. 3]

To fail to appreciate this discreetly non-articulated British approach to strategy is to fail to grasp its essence: "it is something that the British government does...not something a bunch of intellectuals debate." [Ref. 7: p.3]

A. HISTORICAL DEVELOPMENT

To establish a basis for considering replacement of the Polaris nuclear submarine force with one-armed with the Trident I missile system, it is first essential to understand the background of British nuclear weapons. Many of the early assumptions made by the British about nuclear weapons are no longer valid. Many of them still are, however, and will continue to be offered as such, forming the milieu and

traditions which will certainly influence the shaping of current and future British nuclear policies.

The United Kingdom came early to the nuclear field. Though Britain's efforts are often forgotten in the face of the massive American scientific and industrial investment in the Manhattan Project, it can be reasonably argued that without the British contribution, the successful development of atomic weapons could not have been achieved in time to have had an impact in World War II.

Prior to the outbreak of war in Europe in 1939, Britain became a refuge for large numbers of people from Hitler's Germany. Among these were significant numbers of distinguished German scientists who were immediately set to work on the theoretical aspects of atomic research. A latent fear developed in both the United States and the United Kingdom that German research on atomic weapons was already far advanced. Though this fear was later proved unfounded, it provided the impetus necessary to spur allied efforts and later joint cooperation toward the development of an operational atomic capability. It is ironic that in Britain and later in the United States, much of the initial research that eventually resulted in production of an atomic bomb was conducted by expatriates from Nazi Germany who had their own special reasons for fearing German success in this area. [Ref. 9: p. 4]

Three major difficulties confronted early research in the field of atomic weaponry and British programs were no

exception. By early 1940, though, British scientists had made significant progress, especially with regard to the gaseous diffusion of U-235 and the determination of critical atomic mass. When the Thompson or MAUD Committee made its recommendation to the Prime Minister in July 1941 that the production of the atomic bomb should be pursued on a large scale, the crucial question had become not the feasibility of building an atomic weapon, but whether it could be completed before the war ended. It is a second irony that much of the successful research accomplished in this field in Britain during this period was done by foreigners who, because of their nationality, were prevented from working on more classified projects and were steered toward the less critical area of nuclear research. [Ref. 9: p. 6]

In the United States atomic research was also going forward, albeit not at the same pace as in Britain. It was spurred in large part by a letter to President Roosevelt, signed by Albert Einstein which warned of the serious dangers associated with significant German advances in the field of atomic weaponry. A Uranium Committee which had been formed in 1939 was brought under the direction of the National Defense Research Committee in June 1940, while as many as sixteen separate study contracts in nuclear research were being funded under U.S. government auspices.

Overtures about the exchange of scientific information began on both sides of the Atlantic soon after the beginning

of the war. The key event was the dispatch by the hard-pressed British of a high-level scientific mission to the United States in the summer of 1940, where its leader, Sir Henry Tizard, proposed "to exchange any secret information possessed by Britain in return for secret information possessed by the United States." [Ref. 9: p. 12] While this agreement provided an exchange of significant scientific data to both sides, particularly in the area of microwave radar, its real importance lay in the basis it established for further scientific collaboration, especially in the field of atomic research. [Ref. 13: p. 142 and Ref. 14: p. 107]

Early comparision showed that, although the United States had devoted considerable energy to the field of atomic research, these efforts were much more theoretical and long-range than those of the British, whose seriously periled national security clearly mandated the weapons-oriented atomic research that was being aggressively pursued. The 'Tube Alloy' program and the confidence of British scientists acted as a catalytic agent for the American effort. It provided "a promise that there was a reasonable chance for something militarily useful during the war in progress. The British... outlined a concrete program." [Ref. 12: p. 43]

As the atomic weapons program of the United States began gathering momentum, it was immediately apparent that it would enjoy significant advantages over Britain's and that a combined effort by both countries promised the best results.

This was formalized by a joint agreement between the two national leaders, President Roosevelt and Prime Minister Churchill, and was designated the Manhattan Engineer District Project. Its director, Brigadier General Leslie Groves, USA, assessed the initial British contribution in the following light "...before the summer of 1942, the relative amount of work being done on the development of atomic energy in the United States and Britain was not greatly unbalanced." [Ref. 10: p. 125] General Groves believed that this situation of general research parity established the basis for cooperation and the exchange of information. Neither he nor most of the other Americans associated with the Manhattan Project, however, expected much from the proposed collaboration. They felt that the U.S. would give up a great deal of information and receive nothing but preliminary laboratory data in return. [Ref. 10: p. 126]

The investment of the United States in the Manhattan Project was enormous. In dollar amounts, it was estimated to cost $2 billion in 1942. In terms of national support, it was considered "an incalculable political risk in case of failure." Both of these facts served to focus American attention and energy on getting an operational weapon into production rather than on exchanges of information which would aid our allies in the postwar period. [Ref. 9: p. 19]

The British, with their own atomic weapons program subordinated to the massive American effort, were acutely

aware of the political sensitivities involved. They were nonetheless determined not to be left out in the cold by American dominance of this collaborative effort. Early indications of excessively tight compartmented research assignments convinced the British of the need to more clearly delineate this program of joint collaboration and exchange in order to protect their own scientific and political interests. This was formally laid out in the Quebec Agreement signed on August 19, 1943 by President Roosevelt and Prime Minister Churchill. Its main points are summarized below:

1. The atomic program would be carried out jointly with a free interchange of information.
2. Neither government would use the results of the research to attack each other.
3. Neither government would pass the information produced to other countries without mutual consent.
4. Actual use of nuclear weapons would require common assent.
5. In view of its disproportionate share of the development, the U.S. President might limit the commercial and industrial uses of atomic energy by Great Britain in such a manner as he considered fair and equitable.

Additionally, a special Combined Policy Committee was set up to resolve any problems arising in this joint weapons development program. [Ref. 11: pp. 187-189 and Ref. 12: pp. 276-279]

The British felt they had guaranteed a full exchange of information in the Manhattan Project by their "grand gesture"

of accepting American postwar control over the potential commercial and industrial applications of atomic energy. Their principal objective was to secure access to the information necessary to produce their own atomic weapons promptly at the war's end. [Ref. 12: p. 273] In discussing the Quebec Agreement, Prime Minister Churchill indicated that "he never expected the United States to take unfair advantage of it." [Ref. 11: p. 189]

Despite these formal understandings, a close collaborative relationship was never effectively achieved. The British contribution was restricted both in scope and in interactions with the U.S. researchers, with only Sir James Chadwick, technical advisor to the British members of the Combined Policy Committee, being allowed access to all phases of the Manhattan Project.

The U.S. attitude was not so much anti-British as it was pro-American. The project administrators felt that British scientists should be subject to the tight security restrictions which were applied to U.S. personnel. It was feared that without universally applied strict controls, atomic secrets would eventually fall into the hands of the Soviet Union, a politically unacceptable situation.

In their concern over American determination not to freely share nuclear information developed in the Manhattan Project, the British raised the question of postwar collaboration in the Spring of 1945. This was especially

significant because a new American President, Harry Truman, had assumed office on the death of President Roosevelt. The British produced a paper entitled "Hyde Park aide-memoire," which embodied an agreement drawn up between Roosevelt and Churchill in September 1944, and which said in part:

> Full collaboration between the United States and the British Government in developing Tube Alloys for military and commercial purposes should continue after the defeat of Japan unless and until terminated by joint agreement. [Ref. 9: p. 25]

Despite this apparent official consensus over continued close collaboration on nuclear research at the highest levels of government, little action was carried out in the lower echelons. In fact, shortly after Sir Henry Maitland Wilson gave his approval on July 4, 1945 to a proposal to drop the atomic bomb on Japan, cooperation on nuclear matters decreased even futher.

The Smyth report on atomic energy, approved by President Truman and issued August 9, 1945, was accompanied by a War Department bulletin which cautioned:

> The best interests of the United States require the utmost cooperation by all concerned in keeping secret now and for all time all scientific and technical information not given in this report or other official sources... [Ref. 12: p. 407]

These events did not portend well for Britain to receive the special nuclear data which she believed her due. The abrupt cessation of Lend-Lease at war's end was also bitterly received in Britain and did little to enhance the spirit of cooperation necessary to sustain any close collaborative effort.

Other problems plagued U.S.-British collaboration on atomic energy matters at the end of the war. Chief among these were (a) concern about the establishment of international controls on nuclear weapons especially with regard to the Soviet Union, and (b) the avoidance of a "disastrous arms race" in the postwar years. General Groves remained opposed to the "full and effective" exchange of information with Britain on the grounds that it would constitute an alliance and would require registration under the United Nations Charter. The inbred reluctance of the Americans to fully 'cut-in' the British to the Manhattan Project was further exacerbated by the new American President's lack of understanding and of personal commitment to the collaborative venture which had characterized his predecessor. [Ref. 9: pp. 25-27]

H.A. DeWeerd notes in a RAND Corporation study that:

> Roosevelt and Churchill went through the war on the assumption that Anglo-American solidarity would characterize postwar politics. Yet Roosevelt was to die and Churchill be driven from office before the war with Japan was over. Their successors, Truman and Attlee did not look at things in the same way that Roosevelt and Churchill did. [Ref. 9: p. 22]

This comment points up the improbabilities and uncertainties in all political agreements. What the British believed to be firmly set in terms of nuclear collaboration and exchange turned out not to guarantee anything. The same sort of misunderstanding would happen years later, and for different reasons, over the Skybolt missile cancellation. Any joint

undertaking between sovereign governments is always subject to political disruption. This has been true of the Polaris program and will remain the case, if the Trident purchase is concluded. It is a potential pitfall that must be borne in mind when considering any cooperative political action, especially in an area so sensitive and critical to national security and sovereignty as nuclear weapons.

Two specific developments were to mark the end of the collaborative research relationship that had grown between the United States and Britain during the war years. On February 16, 1946 it was revealed that an espionage ring had been uncovered in Ottawa, Canada, passing atomic information to the Russian embassy. This incident eventually led to an investigation which discovered that Klaus Fuchs, a British scientist who had been deeply involved in the Los Alamos research, had also passed atomic weapons design data to the Soviet Union. The American fear that vital atomic secrets would eventually leak into the hands of the Russians had finally been realized, and the conduit had been British.

At the same time, Senator Brian McMahon was sponsoring legislation in the U.S. Congress which would set up the Atomic Energy Commission (AEC) and bring the huge U.S. atomic energy research program firmly under civilian control. One of the provisions of this bill prohibited the transfer of any nuclear information to other countries and was designed to protect U.S. secrets from further compromise. This

provision was included without the legislator's knowledge or understanding of the Quebec Agreement and the British contribution to the development of the atomic bomb; but it suited the purposes of the American military, who had been against an open sharing of information almost from the very beginning. With the signing of the McMahon Act by President Truman on August 1, 1946, all collaboration between the U.S. and Britain on nuclear matters "withered away." [Ref. 9: p. 27] Efforts of the new British government of Clement Attlee to restore this special relationship were futile, and the United Kingdom was left to its own devices to build nuclear weapons.

It is difficult to establish the actual dates as to when which British defense programs are launched. What can be done is to develop conclusions based on inferences drawn from visible actions. [Ref. 8: p. 6] This is true of the British decision to produce nuclear weapons. Without fissile material and denied access to American atomic weapons technology by the McMahon Act, Britain was forced to embark on the long, costly course of weapons research on her own. Her intention of producing an atomic bomb had been clearly stated as early as May 1943, when Lord Cherwell (Professor F. A. Lindemann) had frankly acknowledged it as the main reason for wanting "free and complete" access to the technical information developed during the Manhattan Project. [Ref. 12: p. 273]

A gaseous diffusion plant for the separation of uranium isotopes had been established at Rhydmwyn in North Wales in 1940, but had been phased out during the Manhattan Project. In the postwar years, the first concrete step taken in the area of nuclear research was the decision in October 1945 to set up an atomic research station at Harwell. The fact that it was constructed under the auspices of the Ministry of Supply suggested that its purpose was ultimately military. [Ref. 15: pp. 371-372] Plants were started soon after at Windscale and Capenhurst to produce uranium 235 and plutonium, which had been shown to be a superior fissile material. Another experimental atomic research facility was opened at Aldermaston, which later became the Atomic Weapons Research Establishment (AWRE) and produced Britain's first atomic device, successfully tested at the Monte Bello Islands off Australia's North West coast on October 3, 1953. [Ref. 16: p. 433]

Having successfully demonstrated the ability to manufacture nuclear weapons, Britain pressed forward to develop an operational capability. A program to build medium-range jet bombers was funded in the 1954 defense program and by 1956, the Royal Air Force (RAF) was able to deploy atomic bombs on the first of these V-series (Valiant, Vulcan and Victor) bombers. [Ref. 16: p. 433] The decision to proceed with the development of hydrogen (thermonuclear) weapons was announced in the 1955 Defence White Paper, although Sir

Anthony Eden indicated that the Conservative Party had settled on that course of action as early as 1952. [Ref. 8: p. 6] The successful test of a thermonuclear device in May 1957 brought Great Britain into full maturity as a nuclear power. Air Vice-Marshal Stewart W. B. Menaul comments:

> By 1956/57 Britain had designed, manufactured and successfully tested operational atomic and thermonuclear weapons which entitled her to full membership in the nuclear club with America and Russia. The UK's weapons were entirely British produced and controlled, being wholly independent of the U.S. despite claims to the contrary by politicians on both sides of the Atlantic. [Ref. 16: p. 433]

At this juncture, the ability of Britain to field a totally independent nuclear deterrent force had reached its zenith, but events were already in motion that would change the entire nature of international strategic competition and render the British force of V-bombers vulnerable and obsolete. Chief among these were the development and deployment by both the U.S. and the USSR of reliable, nuclear-tipped, intermediate range ballistic missiles (IRBM); the successful test by the Soviets of the first intercontinental ballistic missile (ICBM); and finally the launching in October 1957 of the first artificial satellite, Sputnik I. [Ref. 5: p. 10]

The maturation of Britain as a nuclear power was eventually recognized by the United States, and convinced the U.S. to once again open the door to nuclear cooperation. The McMahon Act had been amended in 1954 to permit "limited exchanges" of nuclear information; but after the successful test of a

British thermonuclear device in May 1957, President Dwight D. Eisenhower was able to propose a greater exchange with countries which had "made substantial progress in the development of atomic weapons." The resulting legislation passed the U.S. Congress in July 1958, and led to an Anglo-American agreement "for Cooperation on the Uses of Atomic Energy for Mutual Defense Purposes." In 1959, this agreement was further amended, and Britain was placed in a "special and elevated" position with regard to nuclear weapon cooperation. [Ref. 6: p. 7] The special relationship which had characterized Anglo-American collaboration in this area had been renewed.

In spite of the cancellation of Lend-Lease aid and the cessation of mutual atomic development efforts, Anglo-American relations remained remarkably close during the postwar years. The consolidation of Soviet power throughout the Eastern Bloc countries; the Greek Civil War and the Truman Doctrine; the Berlin Blockade; the Korean War and other Soviet political pressures served to polarize the national interests of the major countries of the world along distinctly separate, ideologically estranged lines. In the face of communist aggression in Western Europe and the Far East, massive Soviet conventional superiority on the European continent and the first successful test of a Soviet atomic bomb in 1949, Britain found herself increasingly allied with the nations of western Europe against the Soviet Union. She signed the Dunkirk

Treaty and the Brussels Pact, and firmly committed herself to the North Atlantic Treaty Organization (NATO). In 1948, prompted by the Berlin Crisis, the Labour Government began the practice of allowing U.S. Strategic Air Command (SAC) bombers, armed with atomic weapons, to operate from British bases. [Ref. 8: p. 4] This action was the first in a series of allied decisions to rely on nuclear weapons that was to characterize the strategic planning of the 1950s.

No sooner had the RAF V-bomber force been deployed as the mainstay of the British strategic deterrent than its weaknesses and increasing vulnerability to surprise attack were revealed by the advent of ballistic missile weaponry. Never numbering more than 200 aircraft, the V-bombers were described as possessing capabilities "equal to any in the world." [Ref. 6: p. 13] The fact remained, however, that altogether they only amounted to about 5 per cent of the bomb lift capability attributed to SAC. Dispersal techniques, accelerated scramble capabilities and a random mobility program were instituted to reduce the vulnerability of the V-bombers to pre-emptive Soviet strikes, but with increasingly sophisticated Soviet air defenses, it was felt that armed with gravity-type nuclear weapons, they would not constitute a significant deterrent threat much beyond the early 1960s.

The development of Blue Steel, a short range (400 mile), subsonic, standoff missile armed with a one-megaton warhead was undertaken to extend the penetration capability of the

V-bomber force until about 1965. [Ref. 17: p. 814] Blue Steel was eventually successfully deployed with front-line RAF units in November 1962 and remained in active service until withdrawn with the abolishment of the RAF Bomber Command in 1968. [Ref. 16: p. 434]

In 1957, an agreement between Prime Minister Harold Macmillan and President Eisenhower authorized the deployment of 60 U.S. Thor IRBMs with the RAF Bomber Command. This system was in place by 1958 and provided Britain with a fully integrated bomber/missile force in the nuclear deterrent role. [Ref. 16: p. 432] The missiles were deployed without any attempt to harden or conceal them and were operated under two-key control which required the presence of a U.S. officer on every Thor base. [Ref. 8: p. 14] The Thor IRBM agreement was designed to strengthen Anglo-American nuclear ties. It took advantage of the favorable geographic position of Britain in targetting IRBMs which were out of range in the United States. It also acted as a stop-gap for the British to develop their own IRBM and for the Americans to complete test and evaluation of the ICBMs which were scheduled to come into service in 1960.

The British had made the decision in 1957 to develop their own IRBM, named Blue Streak, as the next generation of nuclear delivery vehicles, rather than producing a new model supersonic bomber. The Blue Streak was to be a liquid-fueled missile with a range of 2500 miles and designed to be launched

from underground silos. [Ref. 17: p. 433] Although generally thought at the time to be of British design, the Blue Streak's motor and internal guidance system were actually derivatives of an earlier American missile, the Atlas. [Ref. 5: p. 8]

As the development of Blue Streak proceeded, it became apparent that the missile would be technically obsolete even before it could become operational. The liquid fueling process was slow and awkward when compared to the solid fuel propellants which had been perfected. These allowed the production of cheaper, more efficient ballistic missiles. [Ref. 16: p. 433] Additionally, the missile itself in its hardened, fixed launch silos would be increasingly vulnerable to growing Soviet offensive missile strike capability. [Ref. 5: p. 8]

By 1960, 65 million pounds had been expended on Blue Streak and the final cost was estimated at 600 million pounds to complete its development. [Ref. 5: p. 5] Faced with these bleak prospects, the British government chose to terminate the Blue Streak Project in 1960. The cancellation was undoubtedly influenced by the negotiations which the British had begun with the United States in 1958 for procurement of an air-launched ballistic missile called Skybolt. [Ref. 16: p. 433]

It is worth considering the position of Britain in the strategic arena at this junction. Professor P. M. S. Blackett describes it as follows:

> Britain...was not only the first medium power nation to have her own atomic stockpile, but she was also the first atomic power to find herself indefensible against a potentially hostile and much larger atomic power. [Ref. 14: p. 79]

Britain was also the first atomic power to admit that, even with outside assistance, she could not hope to compete in the strategic arms race with the super powers. The cancellation of Blue Streak in 1960 led Professor Norman Gibbs to comment:

> The experience of Britain during the last five or six years suggests that in the West no single nation other than the United States can continue to afford to create and maintain an effective deterrent of its own. [Ref. 18: p. 24]

Britain's efforts to build and deploy an operational nuclear deterrent capability between 1952 and 1962 are aptly described by H. A. DeWeerd as:

> a losing struggle against the rapid obsolescence of first-line military equipment, against the spiralling cost of such equipment, against the mounting requirements for penetrating the air defenses of a great power with certainty, and against the difficulty of maintaining a secure strike-second force in the face of a great power threat. [Ref. 8: p. 2]

The decision to cancel Blue Streak marked a significant turning point in British defense politics, for no British government has seriously considered developing a land-based strategic missile since that time. [Ref. 19: p. 103] The independent strategic force has subsequently been strongly tied to U.S. equipment and support, a fact of no small significance.

Having experienced the costly, difficult and frustrating task of trying to maintain an effective, domestically-produced strategic deterrent during a period of advancing technology and shrinking economic means, the British saw the procurement of the Skybolt missile as the best remaining option to preserve an "independent" strategic capability.

Skybolt was the U.S. Air Force's "Polaris of the Air." A solid-fuel, air-launched ballistic missile, it was designed to achieve pin-point accuracy at ranges of 800 miles to attack and suppress enemy defenses for follow-on strikes by SAC bombers. Although Skybolt's accuracy was much greater than that required for the RAF's counter-city deterrent strategy, it otherwise meshed perfectly with the British strategic requirements of the day.

The Skybolt missile was relatively inexpensive because the United States absorbed most of the development cost. It would extend the useful operational life of the RAF's V-bombers into the 1970s, thus deferring the costs and design imperatives for a replacement. It also preserved the delicate balance of bureaucratic interests among the military services, a factor of no small consideration. The Royal Air Force was affirmed as the custodian of the national deterrent, while the Army and the Royal Navy were free to concentrate on the maintenance of conventional forces in their respective spheres of interest.

The British considered and rejected the Polaris missile system in opting for Skybolt. Although acknowledging the impressive technical achievement that Polaris represented, the British saw it "as too small to provide the range, explosive yield, and air defense countermeasures that would be needed in the future." [Ref. 19: p. 103] In addition to the bureaucratic sensibilities alluded to above, the Chief of the Naval Staff, Lord Mountbatten, was not convinced of the absolute need to maintain a national deterrent force, especially at what undoubtedly would be a cost to the already stretched conventional resources of the Royal Navy. [Ref. 2: p. 26] Polaris thus had no established constituency within the British military hierarchy. In these circumstances and given the relatively promising prospects for Skybolt, it is hardly surprising that the British chose to ask the United States for it.

Unfortunately for Britain, Skybolt was only of several competing systems under development in the United States nuclear arsenal. When it experienced significant growth costs and serious technical deficiencies, particularly with its astro-inertial guidance system, Skybolt became a prime candidate for cancellation. This was especially true in light of the successes of other strategic development programs, notably Polaris and Minuteman. The importance of Skybolt's "defense suppression" mission also faded with the realization that with the deployment of Minuteman and Polaris

ballistic missiles, the dominance of manned bombers in the strategic deterrent force would end.

The British did not enjoy the luxury of the United States in being able to choose between several competing strategic options. Great Britain had sufficient political and economic capital to procure and operate only a single strategic weapons system in the maintenance of her national deterrent capability. For a variety of reasons outlined above, Skybolt was chosen as the principal vehicle for that force. When cost and technology factors finally culminated in the U.S. Department of Defense's decision in 1962 to cancel the Skybolt program, the resulting blow to British strategic planning, political stability and international prestige was enormous.

The entire Skybolt Affair has been described as a "Pinero drama of misunderstanding." [Ref. 22: p. 861] The reasons for this major clash of national interests have already been explored well by a number of authors. [Ref. 20] It is relevant here to note the critical impact this decision had on the British nuclear force. Only the continuing commitment to maintain a deterrent force has remained the same since.

At the Nassau Conference between Prime Minister Macmillan and President Kennedy which followed the Skybolt announcement in December 1962, the British were able to extract promises from the Americans to buy, on very favorable terms, the Polaris ballistic missile system. This action provided the equipment necessary to maintain a credible British deterrent,

but it also completely restructured the entire basis of British nuclear strategy in the space of a few short weeks.

The Royal Navy, much to its chagrin, became overnight the possessor of the nation's nuclear striking force. The Royal Air Force, long dominant in the strategic nuclear sphere, was dramatically relegated to a second-class, tactical role. Though several years would pass before HMS Resolution would begin her first operational patrol (1968), the course of British strategic policy had been clearly laid down in January 1963 and everything that followed was merely the mechanics of carrying out this momentous decision.

The Polaris submarine-launched ballistic missile had originally been considered for the British nuclear deterrent, but had been rejected because it didn't have the strategic characteristics desired nor would it have fallen under the bureaucratic control of the Royal Air Force. Though the British acknowledged its technical superiority and better long-term prospects, they felt that the time required to construct the submarine force would leave the United Kingdom vulnerable to Soviet blackmail because of the increasing difficulty its V-bombers would have in penetrating Soviet air defenses. [Ref. 5: p. 16]

What had been logically and precisely rejected in 1960 was quickly accepted in 1962 because there was nothing else available to Britain if it wanted to maintain a technically competent deterrent force. The U.S. State Department was

vigorously opposed to offering the British the Polaris A-3 missile, mostly for reasons of security and proliferation. They initially persuaded the Department of Defense and the President to offer the shorter range Hound Dog missile instead. With characteristics similar to the Blue Steel, it was hardly what the British had in mind for their strategic strike force. Putting it succinctly, a British Defence commentator pointed out in a typically brusque British manner that it would be quite impossible for the "independence" of the British people to rest on something called "Hound Dog." [Ref. 20:p. 48]

Unprepared for the level and emotional trauma of British dismay at the cancellation of the Skybolt missile and the domestic ramifications which ensued, President Kennedy was easily convinced to offer his friend, Prime Minister Macmillan, the Polaris A-3 in its place and on very generous terms. The missiles were to be sold to the British at cost, plus 5% to help defray the heavy expenditure on research and development borne by the United States. The only caveat attached by the United States to the sale of Polaris was that the British forces be committed to NATO and targetted in accordance with NATO plans. This was the opening gambit of an American attempt to corral Britain into a multilateral NATO nuclear force that would both satisfy European demands for a voice in nuclear-decision making and also reconcile accusations that Britain was getting preferential treatment within the

alliance. The final communique from the Nassau Conference stated "these British forces will be used for the purposes of international defence of the Western alliance in all circumstances." However, Prime Minister Macmillan, concerned as have been all British governments before and since with the question of the "independence" of the deterrent force, ensured the insertion of a crucial qualifier into this NATO commitment as follows: "except where Her Majesty's Government may decide that supreme national interests are at stake." [Ref. 5: p. 18] Thus was set the material and strategic structure of the British deterrent force for decades to come.

A force of Polaris-equipped submarines seemed ideal for a smaller nuclear nation like Britain. They were excellent "second-strike" weapons. Operating underwater and relatively immune from hostile interdiction, they constituted a safe and credible deterrent. They lacked the accuracy and size to seriously threaten a superpower's strategic forces, but still possessed a significant potential for crude retaliation against its populations and social structure. They embodied the theory of sufficiency and proportionality espoused by the French - i.e., the ability to "tear off an arm" of a potential enemy.

The British originally planned to construct 5 ballistic missile submarines, but the economics and the politics of the occasion were eventually to limit to 4 the number built, and was to prove a penny-wise and pound-foolish decision in the

long term. HMS Resolution and her sisters Renown, Repulse and Revenge were built by the British dockyards at Vickers, Barrow-in-Furness and Cammell Laird, Birkenhead. Based on the successful American Polaris boats of the George Washington and Lafayette class, they were designed and constructed by the British in an average time of 4 and 3/4 years. The Polaris missiles and supporting systems were procured from the U.S., but the warheads were of British design and manufactured by the British Nuclear Weapons Research Establishment (NWRE) at Aldermaston. Cooperative agreements existed between the United States and Britain on fissile materials, but it is not known what part they may have played in the operational beginning of the British SSBN program.

Some people would argue that the British Polaris program marked the end of their real contribution to the defense of the Western alliance. Vice-Air Marshal Stewart Menaul notes that at the height of the Cuban missile crisis, the RAF Bomber Command, with its V-bombers and Thor IRBMs, could deliver the nuclear equivalent of 250 million tons of high explosive (250 megatons) to targets in Russia. 7 years later, after the Royal Navy and its Polaris submarine force had assumed the strategic deterrent mission from the RAF, the most which they could theoretically deploy was 32 megatons and that required 2 boats on station. [Ref. 16: pp. 433, 434] These statistics could not reflect the greater survivability which the Polaris SSBNs brought to the British deterrent or the greater ability

of their missiles to penetrate Soviet defenses. Lawrence Freedman puts the situation in perspective in the following manner:

> After Nassau, the future of the British strategic nuclear force was more secure than ever before, employing the most advanced American technology, yet firmly under national control. The general argument with the Americans over strategy, and the publicity given to Britain's dependence on American missiles with the Skyvolt affair, exposed the underlying weakness of the rationale that had been developed during the 1950s to support the nuclear force. [Ref. 5: p. 17]

The submarine-launched Polaris A-3 ballistic missile has been the first-line weapon of Britain's nuclear arsenal since it was first deployed in 1968. Concern over potential Soviet anti-ballistic missile (ABM) defenses led to the initiation of a 1 billion pound warhead modernization program in the early 1970s. Known as Chevaline and completed and publicly announced in January 1980, this up-date incorporated new state-of-the-art technology into the existing Polaris design to increase the ability of the warheads to successfully penetrate potentially more sophisticated Soviet ABM defenses. As the last of the British Polaris boats begin their second decade of service, the question of their eventual replacement has become the thorniest problem to face British strategists for years. Not only does the question raise the material/ equipment aspects, but it also raises political and strategic justifications, a subject successive British governments of both parties have been quite content to leave alone. It is a question, however, which events have moved rapidly to decide.

B. POLITICAL RATIONALES

Ian Smart first raised the issue of the continued effectiveness of the Polaris deterrent force and its eventual replacement in his publications in 1977 and 1978. Since then, much of the general debate on the subject has focused on the technical aspects of the problem, at the expense of scrutinizing the basic premise that British national policy requires the maintenance of a credible strategic nuclear deterrent. Smart understood the essentiality of this question and its need for a positive affirmation when he remarked:

> The mere habit of maintaining a nuclear deterrent, which has been formed over the last two decades, is no sufficient reason, by itself, for deciding that the Polaris force, when it ceases to be operational in the early 1990s, should hand on its task to a successor. [Ref. 4: p. 4.]

Expanding on this theme, Smart goes on to assert that technical and economic considerations aside, there may be very real ethical and political reasons for not seeking a Polaris replacement and that, conversely, any decision to procure a follow-on system, if it is to be rational, must be based on the relative costs and benefits of doing so. [Ref. 3: p. 561] "The decision whether or not to replace the Polaris force hinges, in the first instance, on the view taken of the strategic role and utility of a British nuclear deterrent, now and in the future." [Ref. 4: p. 4]

Lawrence Freedman divides the replacement question into two parts: "whether it is worth having a nuclear force at all; and the most appropriate force, if the answer to the

first part of the question is positive." He goes on to remark that he is "more confident in (his) views of the second of these matters than on the first." [Ref. 5: p. xv]

Peter Nailor asks "the fundamental question...whether nuclear weapons could or should have a place in the spectrum of British power." The basis for this question is the "continuing debate, sometimes active, sometimes dormant, about why and how Britain should maintain a strategic nuclear weapon capability." Nailor goes right to the heart of the strategic and political implications when he comments:

> 'Why' is not confined to ethics, it is also about purpose; and 'how' is not confined to engineering capability, it is also about costs and politics. [Ref. 30: p. 2]

Establishing the continued strategic and political need for the British nuclear deterrent in a contemporary context should be one of the critical requirements in moving forward to any replacement system, but it is not something which constitutes a new decision. The British have possessed a strategic nuclear strike capability since the mid-1950s. Their delivery systems have changed with time and advances in technology, but the capability and strategic goals envisioned by the British have remained relatively constant since their inception.

One of the factors complicating potential choices in this area is the fact that the already existing system is both effective and credible and has at least half its designed

operational life still in the future. Lawrence Freedman maintains that the mere existence of the present strategic nuclear deterrent force will be a major factor in Britain's decision to continue as a nuclear power into the next century. He states:

> The politics of beginning or terminating some activity are usually far more difficult than the politics of carrying on as before. To add or subtract a nuclear capability would command attention: to maintain it would barely be noticed. [Ref. 5: p. 140]

If the Royal Navy's Polaris submarine squadron had not already compiled an enviable record of operational reliability at relatively small cost to the British defense budget, it would be easier to consider phasing out the strategic deterrent as a serious replacement option. Without this being the case, existing strategic and bureaucratic interests will exert a strong and perhaps decisive influence on the decision to maintain a strategic nuclear deterrent into the 21st century.

Earlier in Chapter 1, the historical development of Britain's nuclear arsenal was considered, together with the difficulty of firmly establishing the strategical basis for that force, given the lack of definitive governmental pronouncements on the matter. If a logical rationale is to be developed for the current and future utility of the British strategic nuclear deterrent, the relevant methods and reasons which have resulted from the distinctly British strategic style used to date must be ascertained.

As has been pointed out, Great Britain was early in the field of nuclear weapons research and development. It was a matter of the highest national priority to beat the Germans to the bomb. Lawrence Freedman indicates that this absolute requirement, pursued in the interest of protecting national sovereignty, was the key variable in the British decision to subordinate their significant atomic research efforts to those of the Americans in the "Manhattan Project." [Ref. 5: p. 1] British post-war efforts to acquire their own nuclear weapons were:

> determined by the assumption that a major power had little choice but to develop the most modern weapons available, and by the irritating fact the Americans ended the post-war partnership in atomic research somewhat abruptly. Aggrieved that the United States was not willing to reward Britain's wartime selflessness in assisting the American programme, it was felt that the only option was to go it alone and become a self-sufficient nuclear power. [Ref. 5: p. 1]

If British defense policy has not been particularly well elucidated in the post-war era, there have, at least, been several consistent strains of action which serve to sketch a rough outline of what those policies have been. Dan Smith enumerates these constants in the following manner:

- military withdrawal from the Empire.

- the commitment to NATO which over the years has become its present, central and defining role.

- the search for, then acquisition and possession of a major nuclear force. [Ref. 29: p. 65]

The withdrawal from empire has been partly a function of economics. Britain, as a medium power, simply no longer

had the wherewithal to support her traditional leadership role in the world. In fact, this retrenchment was not simply limited to the empire, it has permeated British defense policy for the past thirty years. Smith calls it "a record of constant chops and changes, a hodge-podge of adjustments made here, promised there, and later countermanded everywhere, a long-range planner's nightmare." [Ref. 29: p. 65] He sees it as an invisible, but constant fourth factor affecting British defense strategy, because the "chops and changes themselves have become a constant theme" and are acquiring an inertia of their own. [Ref. 29: p. 67]

The "unprecedented participation" by the British "in long-term Western European defense arrangements" in the post-war era is a recognition that the serious military threat posed by the Soviet bloc nations of Eastern Europe could only be adequately met by a truly functional system of collective security. [Ref. 19: p. 75] No longer was Britain alone able to provide the key weight of force needed to keep the European balance of power stable and favorable to Britain. The bi-polarity of the Cold War made the maintenance of large British armies on the continent a necessary part of NATO strategy, and drew heavily upon the increasingly scarce conventional assets available to accomplish the task.

If the gradual withdrawal and concentration of British conventional forces in the central European theater has been a constant feature of current British strategy, the

acquisition and deployment of an operational strategic nuclear deterrent force has been the principal theme, pursued aggressively and on an absolute priority basis. David Yost points out:

> a slowly increasing tendency to rely on deterrence of Soviet military action by the threat of strategic nuclear retaliation...has been in the background of all British strategic planning since the early fifties, and the object of policy adjustments has been to provide the means to enhance or restore the credibility of this threat and the stability of Soviet-American mutual deterrence. [Ref. 19: pp. 75-76]

In March 1981, Robin Ranger cited the traditional reasons given for the British development of an atomic capability after World War II as follows:

- in the military-political setting existing between 1940 and 1952, it was inconceivable not to develop them.
- doubt existed in 1945, as to whether the United States would commit herself to the defense of Western Europe.
- the assumed slow growth of the U.S. nuclear arsenal meant that the British would have to have their own weapons to hit their own priority targets, such as submarine pens. [Ref. 7: p. 5]

Peter Nailor outlines his judgement of Britain's (and France's) initial nuclear rationales in this way:

- a determination, in the earliest post-war periods, not to acquiesce in the abandonment of a capability which they had helped to pioneer.
- a precaution against radical change in the diplomatic alignments between East and West.
- a demonstration of their distinctive attributes as major powers, at a time when other attributes, like colonial possessions, were being cut away. [Ref. 30: p. 7]

Nailor underscores the lack of British declaratory policy when he notes "by comparison with the United States and French official explanations and legislative discussions, the material about the objectives of the (British) policy, rather than the capability to execute it, is thin." [Ref. 30: p. 3] He does, however, reiterate the reasons the British commonly espouse for being in the nuclear race at all. They were among the first to have a serious development program and there was a general consensus that a British bomb would make a real contribution to the strength of the Western alliance while the U.S. arsenal was being built. Not only would uniquely British targets be accommodated, but there would be a joint burden-sharing along the lines developed during wartime cooperation. The British force would thus "embody a specific military utility and a wider political utility, both within the alliance and vis-a-vis the major adversary." [Ref. 30: p. 3] Lawrence Freedman discusses this aspect in the following manner:

> The assumption of the mid-1940s, that the construction of large, reliable and impressive stockpiles of nuclear weapons would be a slow and tortuous development had proved to be false. By 1952 (the year of Britain's first A-bomb test), the United States was accumulating an imposing arsenal and was rapidly developing the relevant technology in all directions. [Ref. 5: p. 2]

Freedman goes on to chronicle the rapid progression of the United States and the Soviet Union from atomic fission to thermonuclear fusion and notes subtly that "Britain's capacity to continue to play a major world role was coming to be doubted." [Ref. 5: p. 2]

In spite of these systemic changes in the acknowledged world order, a crucial point that dominated British strategic planning was the highest priority which successive British governments of both major parties have given to the acquisition and maintenance of a strategic nuclear deterrent force. Dan Smith emphasizes in "contrast to the general tangle, the constancy with which the nuclear weapon dimension...has been pursued." He goes on to say that "there must be something special about the possession of a major nuclear force for it to have survived...through all the chops and changes, against all the pressures which have made themselves felt elsewhere in the military budget and force structure." [Ref. 29: p. 67] Robin Ranger points out that actual force expenditures confirm the top priority assigned to the strategic nuclear deterrent. He notes that "the British have spent very significant resources, given their poor economic performance, on making their nuclear force as effective as possible...(these) expenditures suggest an absolute priority for the British nuclear force." [Ref. 7: p. 7]

Dan Smith goes further in alluding to a point which previously surfaced in a discussion of the Polaris replacement question, when he asks whether

> this 'something very special' may simply be the durability of the theme: after years in which all else has been in question apart from the fundamental commitment to NATO, there must be a great temptation simply to hang on to whatever clear strands have emerged. After all these years of successfully protecting nuclear weapons capability against all-comers, why question it now? [Ref. 29: p. 67]

Peter Nailor illuminates a basic tenet of this replacement debate when he once again underscores the differences between acquiring a new capability and continuing an already existing one. His consideration of the reality of strategy and politics is correct when he "highlights the fact that specific and positive reasons will have to advance in order to justifiy discarding it." [Ref. 30: p. 7]

The British government's explicit decision to proceed independently in the manufacture of atomic weapons was not made until January, 1947 under a special six-man committee chaired by Prime Minister Attlee. This decision was announced with a minimum of fanfare during a parliamentary debate in May 1948. [Ref. 40: pp. 182-185, 212] Lawrence Freedman reminds us that "this decision was taken at a time of great uncertainty over the shape of world politics." [Ref. 5: p. 1]

In the time intervening between this decision and the actual first successful British bomb test in the Monte Bello islands in October, 1952, the international scene had become much clearer. The Soviet Union was established as the explicit threat in 1948 following the Soviet-inspired coups in Rumania and Czechoslova-ia. The Brussels Treaty or Western European Union for collective self-defense had been signed in March 1948 and had preceded the Soviet Berlin blockade by a scant several months. Great Britain had joined the United States and the other Western European nations as formal allies with the signing of the North Atlantic Treaty in April 1949. [Ref. 19: pp. 78-80]

David Yost has established three particular phases of British defense strategy in the wake of the Second World War. The first, conducted by the Attlee government between 1945 and 1951, was characterized by an extensive military demobilization program and a great hope in the collective security potential of the United Nations. [Ref. 19: p. 162]

The recurrent theme, for Britain at least, was a return to normal peacetime conditions. War in general, and specifically with the Soviet Union, was certainly not seen as inevitable or unavoidable and if it were to occur, "it was assumed that it would be much like World War II--a struggle lasting for years between huge armies and navies. American and Soviet nuclear weapons were thought too few to be decisive." [Ref. 19: p. 162]

The single event that significantly shaped British defense policy in the early 1950s and heralded the end of this initial phase of post-war strategic planning was the invasion of South Korea in June 1950. Although there had been a creeping cynicism and mistrust of the Soviets since 1948, the Korean "police action" was viewed by the British as a prelude to war in Europe. It spurred extensive rearmament programs begun under Attlee and pursued by his successor, Winston Churchill, to train reserves, build thousands of tanks, ships and planes and amass the stocks of food and raw materials that would be needed to fight a World War II campaign of logistics and maneuver.

The implication to be drawn from the British participation in and commitment of significant material and personnel resources to the United Nations effort on the Korean peninsula was the premise that this would obligate the United States to the defense of Europe, should the need arise. [Ref. 19: p. 81] Under the Attlee government, however, there remained a basically anti-nuclear bias, despite its decision in 1947 to proceed with the development of its own atomic weapons. Prime Minister Attlee's long, consultative visit to the United States in the fall of 1950 "apparently was motivated by concern about the (Korean) war's widening to Europe and...by anxiety about the American use of nuclear weapons in Korea." [Ref. 19: p. 81]

Prime Minister Attlee apparently perceived a dilemma in his ultimate goal of wanting "a Western world strong enough to resist aggression, and therefore to prevent aggression and to preserve the peace." The problem that presented itself was that "the United States would use British bases to strike the Soviet Union and thereby open Britain to nuclear retaliation. At the same time, Attlee did not wish to weaken the assumed probability of this American retaliation." [Ref. 19: p. 82]

When Churchill returned as Prime Minister in October, 1951, he was even more preoccupied than Attlee had been with the imminence of war and of the conventional dangers posed by the Soviet Union. He had after all delivered his famous "Iron Curtain" speech in March, 1946 and his resolve had not weakened when in his 1952 Statement on Defence he indicated

that Britain "should suggest to the mind of a potential paratrooper the back of a hedgehog rather than the paunch of a rabbit." [Ref. 19: p. 84]

During this second major phase of post-war British strategic thinking, two major concepts seemed to dominate defense planning. The first of these was what might be termed "broken-backed warfare." Succinctly described, this conceived of initial, almost decisive nuclear strikes in the first month or even week, after which "it would be a broken-back war in which no great armies could be moved over long distances." The battle to victory would be fought by troops rapidly mobilized behind the front lines in Germany. [Ref. 19: p. 85]

Accompanying this "broken-backed" concept was what can properly be identified as the British "New Look." The realization that their conventional "rearmament would have to be spread over a longer period and held to a lower peak," in order to pursue the twin objectives of "financial solvency and military security." [Ref. 19: p. 84] This concept closely paralleled that of the American defense "New Look" being advocated by President Eisenhower and was an acknowledgement that what was anticipated was a "long cold war against communist subversion" and what was required was "not a violent jerk, but a prolonged pull" against this serious and potentially crippling threat. [Ref. 19: p. 84]

Beginning about 1952, Yost catalogs a fundamental but almost imperceptible shift in Churchill's views on defense

strategy taking place, with a greatly increased emphasis on the use of nuclear weapons to deter Soviet aggression. This change closely parallels the shift that was occurring during the same period in U.S. defense planning and for generally similar reasons. Although it would be several more years before this change in British policy became well-defined, the increased reliance it placed on nuclear weapons beginning in the early 1950s represented a basic transformation of British national defense policy which even in contemporary terms remains essentially unchanged. [Ref. 19: pp. 83-94]

Lawrence Freedman notes that "with a change to a Conservative Government in 1951 the nuclear aversion in British defence policy became transformed into a nuclear bias...very much favoured by the Prime Minister Winston Churchill." He goes on to note that Churchill's principal motives seem to have been "the strides that had been taken in the development and production of nuclear weapons in the United States since 1945" and the fact that "Britain was still incurring a heavy financial burden in building up its conventional forces." [Ref. 5: p. 3]

Three central themes were factors in the Prime Minister's gradual but certain shift in policy that constituted the third and most important phase of British post-World War II military strategy. First, he perceived a change in the nature of the threat and an increased possibility of accommodation following the death of Stalin. Secondly, he viewed the advent of

thermonuclear weapons, as contrasted to fission bombs, as portending a lasting qualitative as well as quantitative change in the nature of war. Lastly, the Prime Minister drew what he believed to be the inescapable conclusion that for Britain what would be required then and in the future was a policy of "peace through strength" with avenues of possible accommodation being explored through expanded channels of communication. [Ref. 19: pp. 85-86]

Probably the single factor which most impressed Prime Minister Churchill and became the focal pivot for his change in direction was the immense destructiveness associated with thermonuclear weapons. Although the subject had previously been referred to, the British government apparently "did not take much notice of the hydrogen bomb's development until the American tests had taken place." [Ref. 19: p. 86] Dan Smith has examined the argument that nuclear weapons were only but one aspect along a continuum of force in this respect and he concluded:

> Elegant though these arguments may be presented, they disguise problems rather than confront or solve them... the immensity of destruction which would be possible in a nuclear war, on a scale which has wide reach both geographically and temporally... (indicates) at some point along the continuum of force quantitative change becomes qualitative. [Ref. 29: p. 74]

The 1955 White Paper on Defence, authored by the Churchill government, reports that "overshadowing all else in the year 1954 has been the emergence of the thermo - nuclear bomb," which had "significantly reduced the risk of war on a major scale." [Ref. 19: p. 87]

David Yost outlines Churchill's keystone to the entire concept of "peace through strength" as to the commitment of the United States strategic nuclear weapons to retaliation against Soviet aggression. [Ref. 19: p. 88] The Prime Minister originally envisioned a three-fold program to support this fundamental policy change, consisting of increased civil defense preparedness, a significant British strategic thermo-nuclear capability and the acquisition of tactical nuclear weapons for use on the continent with a resulting reduction in manpower and increase in local firepower. What these would provide would be the time to bargain for a political settlement on the brink of nuclear war - a concept today closely resembling that of "crisis management." [Ref. 19: p. 90]

Probably the single most vocal advocate during this period for a shift to nuclear weapons as the principal deterrent to Soviet aggression was Marshal of the Royal Air Force Sir John Slessor. In his book, the Great Deterrent, he argued that nuclear weapons completely revolutionized warfare, making the methods of World War II obsolete. The immense destructiveness of high-yield thermonuclear weapons has minimized the possibility that anyone will ever again resort to major war as an instrument of policy and their possession is a major guarantor of peace. [Ref. 41: pp. 262-265]

A Global Strategy Paper produced in 1952 by the British Chiefs of Staff argued that "much more reliance should be

placed on nuclear threats in containing the expansion of Soviet power." [Ref. 5: p. 3] This recommendation, however, contained a number of assumptions as follows:

- the destructive power of nuclear weapons was so great that no nation would dare provoke a war in which there was the slightest risk of it becoming the victim of them.

- there was no real defense against nuclear weapons.

- although significant resources would have to be devoted to developing a "credible" nuclear capability, it would be far less than that required to match the vast conventional forces at the disposal of the Kremlin. [Ref. 5: p. 3]

David Yost's analysis of the assumptions behind the increasingly nuclear bend of British military strategy in the 1950s, attempts to combine the political hopes as well as the military realities of the period. He sees Churchill's government perceiving first:

> that the Soviet threat is not directly military as much as it is political and ideological, and that the Soviets may in time change their views to ones more favorable to the survival of Western values. The second and related assumption is that outright Soviet attack can be deterred indefinitely by the threat of strategic nuclear retaliation, even (or particularly) in conditions of mutual assured destruction. [Ref. 19: pp. 164-165]

Yost summarizes the British strategic thinking in this manner: "the threat of war is minimal. Only a Soviet miscalculation could result in an attack at any level. If the attack were small, conventional forces could readily contain it. If the attack were too great to be contained by conventional forces, crisis management would be attempted--bargaining under threat of escalation to strategic nuclear war." [Ref. 19: p. 164]

The United States, British and NATO strategies in the 1950s all shifted toward reliance on nuclear weapons as the principal deterrent to Soviet aggression. Secretary of State John Foster Dulles called it "massive retaliation," which was something of a misnomer. The 1957 British Defence White Paper, as presented by Minister of Defence Duncan Sandys' emphasized the "commitment to nuclear weapons as the most effective deterrent to war and means of waging it, should it occur." This, he said, meant "large conventional forces were no longer required...(and) allowed for the termination of national service and a cut in the defence budget." [Ref. 5: p. 4] In 1958, Sandys went even further in declaring that the West now had little choice, but to rely on nuclear deterrence. He said:

> ...it must be understood that if Russia were to launch a major attack on (the Western powers) even with conventional forces only, they would have to hit back with strategic nuclear weapons. In fact, the strategy of NATO is based on the frank recognition that full-scale Soviet attack could not be repelled without resort to a massive nuclear bombardment of the sources of power in Russia. [Ref. 5: p. 4]

Although the theory of strategic deterrence and nuclear warfare as conceived by the United States has undergone a series of permutations since Eisenhower's "New Look," the same theories and concepts have remained relatively unchanged through a number of British governments down to the present day. The three Conservative governments in power between 1955 and 1964 shaped the definitive policy as conceived by Winston Churchill. The Labour victory in 1964 resulted in

minor touches to the strategy but no radical revisions or departures as many had expected.

Michael Howard, a contemporary commentator on defense affairs, has reported what he terms Healey's Theorem, named after the Labour Secretary of State for Defence in this government. It states the strategic deterrent effect of even an uncertain nuclear threat such as Britain's: "if there is one chance in a hundred of nuclear weapons being used, the odds would be enough to deter an aggressor even if they were not enough to reassure an ally." [Ref. 42: p. 262] The only substantive change made during this Labour regime was the cancellation of the planned fifth Polaris SSBN for supposed reasons of economy. Though this had a significant material and operational impact, it in no way altered the fundamental strategic concept on which the force was established.

Since 1970, both Conservative and Labour governments have continued what David Yost calls the "Establishment Doctrine." [Ref. 19: p. 141] The fundamental concepts of strategic nuclear deterrence while seeking accommodation were not changed at all. The concept of preventing war by threat of nuclear punishment became deeply embeded in the British strategic heritage. The idea of fielding a war-fighting capability - that is, preparing to win or even survive a thermonuclear conflict - was rejected as passe and even absurd. The plans formulated under Denis Healey to meet minor threats with conventional weapons and major ones with crisis management

were formal rather than substantive policy shifts. [Ref. 19: p. 141] Denial strategies have been accepted only to the extent that they deny the Soviets an easy victory. Adoption of a larger denial strategy "would entail a shift away from the keystone of British defense policy which has been deterrence through the retaliatory threat of nuclear punishment." [Ref. 19: p. 165]

Yost summarizes as follows: "except for equipment changes and budget cuts, the policy has remained in its essence as Churchill described it...the changes in policy since which have received the most attention are comparatively superficial... the acquisition of Polaris submarines, for example, was simply a change in equipment." [Ref. 19: pp. 164-165] The British "theme has been movement away from the expectations of a conflict similar to World War II toward consolidation of confidence in NATO policies calling for forces capable only of crisis management." [Ref. 19: p. 166]

Having discerned from the ambiguous declaratory information available, what the implied British strategic nuclear policy has been since the mid-1950s, it is possible to examine how they have consistently and rigorously tailored their limited resources to insure support for these NATO and Western strategies and insure the protection of their own ultimate national sovereignty. Lawrence Freedman points out that "it never seriously occurred to responsible British politicians and officials that any special rationale was

needed to justify staying in the (nuclear) business." He goes on to say that "if the West was going to rely on the deterrent effect of nuclear power, then it seemed only proper that a country of Britain's status should participate fully in the construction and implementation of that strategy." [Ref. 5: p. 5]

Freedman quotes the then British Minister of Defence, Harold Macmillan, arguing in 1955 against the "dangerous doctrine" of relying solely on the U.S. nuclear deterrent to the exclusion of the British contribution:

> Politically it surrenders our power to influence American policy and then, strategically and tactically it equally deprives us of any influence over the selection of targets and the use of our vital striking forces. The one, therefore weakens our prestige and our influence in the world, and the other might imperil our safety. [Ref. [Ref. 5: p. 5]

In 1958, Duncan Sandys made clear the proposition that although it did not compare in total size to the U.S. force, "when fully equipped with megaton weapons, the British bomber force will in itself constitute a formidable deterrent." [Ref. 5: p. 4]

There was a fear in the early years of the Cold War that, if Britain became excessively dependent on the United States' strategic deterrent, she would be left dangerously exposed if there was a dramatic change towards a modern version of American isolationism. [Ref. 5: p. 4] Robin Ranger goes much further in this area in describing what he feels has been the British central concern since 1945:

> the ultimate, irreducible, uncertainty as to the validity of the U.S. nuclear guarantee, especially after the passing of the World War II political leadership in both countries. The British know that political change in the U.S. could combine with a failure to maintain her military forces to produce the danger of an American failure to safeguard their interests if the Soviets invaded Western Europe. The British must therefore be able to compel them to--as they put it--live up to their best instincts. The British are also acutely aware, from experience, that in real crises, self-preservation tends to win out...the argument is neo-Gaullist but it has none of the anti-Americanism of de Gaulle; it is a recognition of the way things are in politics between states, and of the extraordinary reversals possible. [Ref. 7: p. 6]

This accords with Denis Healey's 1959 comments on the implication of the "independent deterrent" aspect of the British nuclear weapons program when he said that "there is little doubt that the main aim of the British thermo-nuclear striking force is to provide passive deterrence for Britain in case America drops her present policy of active deterrence for NATO as a whole." [Ref. 43: p. 225]

Lawrence Freedman follows up these basic rationales with the conclusion that "the British...in the 1950s were aiming for an "independent" nuclear deterrent only in the sense of national control over its use. There was no pretence that there was to be complete self-sufficiency in its development." [Ref. 5: p. 7] If this was true in the 1950s, it is certainly so today when considerably more interdependence exists between the United States and Britain in the area of nuclear weapons research and delivery vehicle production.

What we can conclude is that the main purpose of any British strategic nuclear deterrent is to prevent Soviet aggression by threat of retaliatory strikes, either in combination with the Western alliance or as a weapon of last resort in the protection of Britain's national sovereignty. Peter Nailor is fairly emphatic in this vein when he comments that "thermo-nuclear weapons made small deterrent forces inherently more capable of dealing a politically significant blow to an adversary." [Ref. 30: p. 4]

Nailor goes further in saying that this fact has allowed Britain to maintain her nuclear capability "pretty much at the level conceived" even though the United States and the Soviet Union have developed much larger and more diversified arsenals. This has allowed them to keep "the cost of maintaining a strategic nuclear capability...within reasonable limits, in scientific and production terms, as well as in money costs." [Ref. 30: p. 4] As medium powers, both Britain and subsequently France have concluded that the nuclear "capability needed to maintain a policy of mutual deterrence that is credible to an adversary is relatively small." [Ref. 30: p. 4]

Even though Nailor finds that "the British programme has been developed and sustained against a background of political ambiguity," something of a "British pattern" has emerged that assumes "that a relatively small armoury was sufficient to achieve national objectives." [Ref. 30: p. 4]

This doctrine of nuclear sufficiency or proportionality seems to accord with the British concept of a more conservative analysis of their deterrence requirements than the Americans who have as their objective, the crippling of Soviet industrial-military power. Nailor suggests the British have an attitude of "what they can afford will do," and explains their national objective in this sort of syllogism:

> If you ever attack us, we have the capacity to punish you, even after the event, by destroying many of your cities, and consequently part of your industry and population. This would not only be a grievous blow in itself, but would materially weaken your capacity to successfully withstand an attack from the United States which, for the purposes of this argument, you would have to assume to be a separate actor. [Ref. 30: p. 4]

Neveille Trotter, in a memorandum submitted to Parliament in March 1979, puts things in perspective when he says: "it cannot be too strongly emphasized that the main targets for the deterrent are the minds of the potential opponents and not their military bases or cities. If we have to use the deterrent, then we have lost. While we cannot win a nuclear war, we must be in a position to cause our potential opponents great harm so that they are not prepared to take the risk of starting a nuclear engagement with an attack on this country." [Ref. 26: p. 119] In underscoring the need for a Polaris replacement program, he goes on to address the contemporary situation in this manner:

> In earlier years the Americans had such a superiority in the strategic nuclear field as to make a nuclear attack by the Soviet Union unthinkable. With the Soviets now

> in a position of equality, however, it seems much less likely that a U.S. President would be prepared to commit his country to the horrors of major nuclear attack if Britain rather than America was the subject of an initial nuclear assault. We must therefore continue to possess our own capability for nuclear retaliation. [Ref. 26: p. 119]

In establishing the rationale behind any decision to continue in some form, the British strategic nuclear deterrent beyond the service-life of the present Polaris submarines, one must consider the reasons for abandoning this capability altogether. Peter Nailor adduces that there have been three major lines of argument offered for opting out of the nuclear arena, all of which overlap, but do not easily integrate. The first of these is that possession of nuclear weapons themselves is not only morally and ethically wrong, but makes Britain more vulnerable to nuclear attack than she would be if she did not possess them; secondly, the time is past when Britain's power and interests required a strategic nuclear capability in support, or as a manifestation of the role that she should seek to play in the Atlantic Alliance; and lastly is the utilitarian concept that, given her restricted resources, Britain would do better to employ the monies and skills she has to enhance her conventional forces, rather than to divert them to maintain a marginal increment to the nuclear strength of the United States. [Ref. 30: pp. 2-3]

Dan Smith raises many of the philosophical concerns of the Campaign for Nuclear Disarmament (CND) movement when he says that "it is unlikely that the basic moral and ethical

issues surrounding nuclear weapons will be given a prominent place in the debate about the replacement of the Polaris... yet it ought to be clear that possession of, use and threatened use of nuclear weapons raise profound moral and ethical questions." [Ref. 29: p. 71]

He goes on to indicate only two practicable solutions to this question. The first is that "there is an end of the matter; here is a moral imperative and it must predominate." Nuclear weapons must be given up. His alternative argument is that "the world is more complex than that and that there may be other grounds with different reference points, but ones which are also important, which mean that Britain must have nuclear weapons. If these other grounds, political and strategic, over-ride the moral imperative, then one has a moral dilemma, with which one lives." [Ref. 29: p. 72] Smith then suggests that "if there is a case for Britain extending or replacing the Polaris force, it must be based on clear political and strategic priorities, of enough clarity and weight to over-ride the moral considerations." [Ref. 29: p. 72] He personally does not see them existing.

In considering the status which is supposed to accrue with the possession of nuclear weapons, Ian Smart points out that there does not "seem to be much rational force left in the argument that a nuclear deterrent enhances Britain's general international status, quite apart from the danger that such an argument, if pressed, may tend to offer a general

license for nuclear proliferation." [Ref. 4: p. 5] Lawrence Freedman goes further when he says:

> whether or not nuclear weapons may be necessary for great power status, they are certainly not sufficient. Britain has managed to combine its nuclear status with a general decline in its international position. In the various crises and conflicts of the past years, a British nuclear force has been barely relevant...for the moment it brings no diplomatic advantage. [Ref. 5: pp. 139-140]

Whereas previously, being a nuclear power was thought to guarantee a say in important international decisions, Freedman now points out, "with no surplus (weapons) for negotiations, Britian is attempting to stay out of SALT (Strategic Arms Limitation Talks) rather than participate."

One of the additional implications of British possession, procurement and potential use of nuclear weapons is the effect it has on other states in terms of nuclear weapons proliferation. Critics such as Dan Smith suggest that, if Great Britain were to renounce her nuclear weapons program, she would "set an example for the rest of the world that...would provide effective moral leadership." [Ref. 29: p. 86] Jonathan Alford comments on this argument as regards threshold (those with or close to having the ability to produce nuclear weapons) nations:

> there are no grounds for believing that a British example would affect the decision of a threshold state one way or the other - there will be far more compelling reasons for a state to decide for or against embarking on a nuclear weapons programme. Britain's example would be applauded by the converted and ignored by the determined... in any case it is impossible to unlearn what was once well known. [Ref. 30: p. 35]

One of the peculiar political problems in this regard associated with the potential selection of the Trident missile system by Britain as a replacement for its Polaris force is the fact that it constitutes, as Robin Ranger puts it, "a massive jump in British nuclear capabilities, to those needed for LNO (limited nuclear option), and so offers a new spectrum of influence on U.S. targetting and release policies." [Ref. 7: p. 8] This "vertical" nuclear proliferation will most likely undermine any serious attempts the British might make to influence the nuclear decision-making process of any potential threshold state.

While it is true that abandoning, relinquishing or failing to modernize her strategic nuclear deterrent force might save Britain significant military procurement and operating funds, this does not mean that this money would necessarily be redirected to improve the combat readiness of Britain's conventional forces. These are the very forces which have been the principal focus of all the "chops and changes" that Dan Smith has described as one of the implicit constants in post-World War II British military planning. Because they are not "special" in the sense that nuclear weapons are, there is no guarantee that the conventional arms of the various services would receive any additional funding or consideration in the normal pushing and tugging that constitutes national politics. This could be particularly true if a change of government brought to power a party much more concerned with social reform than with national security.

There are several additional aspects of the rationale behind the British nuclear force which Peter Nailor addresses and which are worthy of note:

> the possession of nuclear weapons may be of particular importance relative to the perceptions of the superpowers. Both the United States and the Soviet Union self-evidently place great emphasis on nuclear weapons. For a nuclear state to renounce possession might affect superpower perspectives more sharply than those of the rest of the world community. [Ref. 30: p. 9]

He talks of the "sense of special danger" which has been an important element in the development of mutual deterrence, which he further describes as "both a situation and a policy." [Ref. 30: p. 9]

Nailor goes on to emphasize the fact that the British Polaris strategic nuclear deterrent force is a political animal, all the technical discussions aside. Cost will be an important factor, but as he points out, "finding the money is a problem, but wanting to find the money is at least as important." [Ref. 30: p. 13] "The deterrent," as he sees it, "is a political phenomenon, as deterrence is a political value, and to that extent it must be judged by political criteria as much as cost or opportunity cost." [Ref. 30: p. 13]

Nailor concludes that for Britain "the future is no less dangerous or uncertain, than it was when she originally acquired a nuclear capability, and having shown persistence in maintaining it, there are no major political reasons for

her to renounce it." [Ref. 30 p. 13] Nailor's colleague, Jonathan Alford, reaches much the same answer in arguing for Britain to maintain her capability for strategic nuclear deterrence against the Soviet Union. He comments:

> If there ever was a case for giving up this capability, it has been seriously weakened by two developments: the new emphasis in Soviet military programmes on weapons systems which cover targets in Western Europe including Britain; and a general trend towards nuclear proliferation, which a decision to opt out of the nuclear game will not arrest. [Ref. 30: p. 36]

Having examined many of the arguments advanced about the maintenance of the British strategic nuclear deterrent force, we must look to official pronouncements to see if we can discern anything further about the government's declaratory policy.

On 24 January 1980, Francis Pym, then Secretary of State for Defence, delivered a major speech to the House of Commons on the "Role of Nuclear Weapons in Britain's Defence." In this presentation, he reminded members of the House that, horrendous though nuclear weapons are, "the fact of their existence is built into the entire structure of security and deterrent balance between East and West" and that this regime has made a "crucial contribution to keeping the peace in the NATO area for half a lifetime. And it has kept the peace, not just nuclear peace." Pym goes on to consider the Soviet threat in this manner: "a potential adversary who has built up and is continuing to build up a vast - and offensively structured - apparatus of military power at all levels and

in all fields." He emphasizes that "its possible use against the West has to be inhibited...by deterrence: that is by fear." [Ref. 44: p. 676]

With all British nuclear forces, both theater and strategic, fully committed to NATO command authority, Secretary Pym reiterates its basic position when he states that what "NATO seeks to do is to work upon the minds of the Soviet leaders. Deterrence is primarily about what the other side thinks, not what we may think." He goes on to indicate that "they (the Soviet leadership) do not think in terms of restraint or defensive strategies or minimum force" and that the job of NATO deterrence is to convince these men that "the alliance will always have within its reach effective options for retaliation rather than accepting defeat." [Ref. 44: p. 677]

Speaking to the direct British contribution to NATO nuclear deterrence, Secretary Pym underscores the point that all the systems owned or fielded by the British and in their exclusive operational control, "are fully committed to the alliance and its deterrent strategy...and conform to the concepts worked out in the highly successful joint forum of the Nuclear Planning Group." [Ref. 44: p. 677] Pym then considers and rejects a number of the themes which over the years have been argued as a justification for the British nuclear capability, including political prestige; status in the alliance or in comparison to France; and the concept of Fortress Britain, i.e., an insurance policy against the

return to isolationism of the United States. The Secretary of State for Defence stresses "what is for me, and for this government, the main point - the decisive consideration. We think that Britain needs to be a nuclear power primarily because of what this contributes to NATO's strategy of deterrence and, through that, to our own national security." [Ref. 44: p. 678]

At this point in his speech to the House, Secretary Pym provided what Lawrence Freedman calls "the most complete statement of the theory of twin decision-centres" that is the heart of current British declaratory policy on its nuclear strategic deterrent force. [Ref. 5: p. 128] Freedman points out that it is worth quoting at length as follows:

> Our strategy seeks to influence Soviet calculations fundamentally and decisively. It seeks to guard against any risk of Soviet miscalculation. The United States, by their words and deeds, have constantly made clear its total commitment to come to the aid of Europe, and to help defend Europe by whatever means are necessary, without exception. No words or deeds in advance could make that more crystal clear. But we are dealing with possible situations that would be without precedent in history, and of unique peril.
>
> The decision to take any nuclear action, at any time, would be vastly hard for any President of the United States to take. In recent years I think it has become even harder, if that is imaginable, because of the fact of super-power nuclear parity. The British government have the greatest confidence in the weight and reality of the United States commitment. We cast no shade of doubt upon it. What matters most is not what we think, but what the Russians think...
>
> The Russians cannot be assumed to look at the world as we do...In a crisis, Soviet leaders - perhaps beset by some pressures of turmoil in the Soviet empire, perhaps looking out upon a NATO Alliance passing through some temporary phase of internal difficulty - might conceivably misread American resolution. They might be tempted to gamble on United States hesitation.

The nuclear decision, whether as a matter of retaliatory response or in another circumstance, would, of course, be no less agonizing for the United Kingdom than for the United States. But it would be a decision of a separate and independent power, and a power whose survival in freedom might be more directly and closely threatened by aggression in Europe than that of the United States. This is where the fact of having two decision-makers instead of one is of such significance.

Soviet leaders would have to assess that there was a greater chance of one of them using its nuclear capability than if there were a single decision-maker across the Atlantic. The risk to the Soviet Union would be inescapably higher and less calculable. This is just another way of saying that deterrence of the Alliance as a whole would be the stronger, the more credible and therefore the more effective. [Ref. 44: pp. 678-679]

Francis Pym's Labour predecessor as Secretary of State for Defence, Fred Mulley, made the same point when he told a Parliamentary Committee: "(the deterrent) provides a second centre of nuclear decision-making within the Alliance. This would complicate the calculations of a possible aggressor... our allies welcome a situation in which the United States is not expected to bear the entire burden of nuclear decision-making." [Ref. 26: p. 6] Even before his speech to the House, Secretary Pym had endorsed the twin decision-centre theory. Addressing his party conference, he said: "our own deterrent will enable the United States, whose contribution is, of course,...crucial, to share the burden of nuclear decision-making...it will powerfully increase the uncertainty in Soviet planning." [Ref. 45]

The origins of the twin decision-centre theory are not clearly known but they were revealed in a Ministry of Defence

document in 1974 which stated that the Polaris force: "gives NATO a separate centre of decision-making in Europe which the Soviets must take into account; it increases the credibility of the overall NATO deterrent; and it provides an element of insurance, and reassurance to our European allies, against any weakening of the United States nuclear guarantee." [Ref. 46: para 32] The 1975 NATO Ottawa communique expressed a similar sentiment.

Lawrence Freedman believes the attraction of the British twin decision-making center argument lies as much in its political utility as in the rigor of its strategic logic. It allows Britain to maintain an independent force, while claiming that it does so for the greater good of the alliance; it covers doubts about the validity of the American guarantee, but it does so implicitly; and it doesn't make nuclear retaliation a certainty, only that it is no certainty that retaliation will be withheld. He puts it in the form of a simple syllogism: "uncertainty improves deterrence; the outcomes of two sets of decisions are more uncertain than one; therefore a condition involving two sets of decisions improves deterrence." [Ref. 5: pp. 129-130]

I have already outlined Robin Ranger's basic rationale for the British strategic nuclear deterrent force, namely doubt about the validity of the U.S. nuclear guarantee in a crisis situation reflecting the realities of current world politics and self-preservation. Ranger goes further in

considering the thesis that "Britain's minimum deterrent has to destroy enough Soviet cities, and people, to deter a Soviet attack on Britain, even if the Soviets (wrongly) thought that the U.S. would not retaliate. It is designed to avoid Soviet misjudgements." His conclusion on this approach is that "the reason the British can rely on the U.S. is because Britain can release nuclear weapons on her own...the British may be prepared to go first release much earlier than the U.S.. Given that British forces are an integral part of British society, especially its officer corps, they are likely to get nuclear support if they are undergoing Soviet attack." [Ref. 7: p. 8]

Ian Smart, in his generally brief consideration of the strategic purposes for continuing the British nuclear deterrent force, reaches the following conclusion:

> My own view is that there is no purpose, for the foreseeable future, in contemplating the need for Britain to deter any power except the Soviet Union by nuclear means, that it is only the contingency of a Soviet nuclear threat to British territory...which can usefully be considered, and that the only credible justification for a British nuclear deterrent must assume that an effective American nuclear guarantee may not, in some plausible circumstances, be available. [Ref. 3: p. 561-562]

Smart goes on to say in a later article that "the only plausible conclusion is that the British Polaris force may be legitimately regarded, in the first instance, as a small and inessential "contribution" to the North Atlantic Treaty Organization (NATO) deterrence, but that, all else failing,

it is intended, in the "last resort" and by itself, to deter Soviet attack, and especially nuclear attack, upon the United Kingdom." [Ref. 36: p. 22]

From the numerous declaratory pronouncements and critical observations outlined above, the conclusion may be reached that there are a number of legitimate rationales for the continued maintenance of the British strategic nuclear deterrent force. Briefly stated they are:

- the substantive contribution it makes to the credible deterrent capability of the Atlantic Alliance.
- the second-center of decision-making it provides with its attendent effect on the minds and calculations of potential aggressors.
- the ultimate insurance policy it provides to the national security and sovereignty of Great Britain at a time of political 'last resort.'

Francis Pym, in announcing the British decision to proceed with procurement of a Polaris replacement system, stated that "the long-term issue is not whether to acquire a strategic nuclear deterrent capability, but whether to give it up in the 1990s after having possessed it, through the decisions of both Conservative and Labour Governments, for nearly forty years." [Ref. 1: para 3] It seems abundantly clear from official statements, academic debates and informed public discussions that the strategic rationales offered for maintaining a credible British strategic nuclear deterrent are generally accepted and that, barring the intervention of other dominant factors, the political and public determination

exists to continue this capability in one form or another. An editorial in the Sunday Times published in the wake of the government's decision to proceed with the Polaris replacement program puts the arguments in focus:

> There is no sense in starting from where we are. We do have a nuclear deterrent. There is a case for keeping it: it is a military contribution to NATO, although marginal; it helps to confuse the Russians by providing a second decision-making centre in the Western camp; to abandon it now would nourish talk about splits in Atlantic solidarity; it is a bargaining counter which can come in useful in future disarmament discussions with the USSR. These bits and pieces add up to a respectable total in favour of prolonging the deterrent...it seems wise to retain - economics permitting - the means to outface threats which could be far commoner in the next generation than they are now. [Ref. 47]

C. EQUIPMENT AND MATERIAL CONSIDERATIONS

The strategic deterrent capability of Britain currently resides in the four ballistic missile submarines of the Resolution class. These Polaris boats have a surface displacement of 7500 tons, a submerged displacement of 8500 tons, are 425 feet long with a maximum submerged speed of 30 knots and a crew of 14 officers and 130 men. They are armed with 16 Polaris A-3 ballistic missiles as a strategic deterrent and six 21-inch torpedo tubes for self-protection. The SSBNs are fitted with one British NR2 pressurized water reactor and are equipped with the latest electronic gear necessary to successfully complete their missions. Each hull was designed to last 20 years, but in practice can be reasonably expected to have a 25-year operational life. [Ref. 4: p. 25]

The Polaris A-3 missile carried by the British SSBNs is a 2-stage, solid-fuel ballistic missile which became operational in the Royal Navy in 1967. It is over 31 feet long, 4.5 feet in diameter, grosses about 35000 lbs and has a throw-weight of 1000 pounds over a range of 2500 nautical miles. In its initial Royal Navy service configuration, the Polaris was fitted with a British-designed warhead section capable of carrying three (3) separate manueverable reentry vehicles (MRV), each with a 200 kiloton fission-fusion (thermonuclear) warhead. This 'triplet' reentry program means the individual warheads are distributed over a single target like a large footprint, but cannot be directed to more widely separated targets like those with a MIRV (multiple independently targetted reentry vehicle) capability. [Ref. 4: p. 26] The missile's front-end was significantly improved by a major Polaris Improvement Program carried out during the 1970s. [Ref. 23]

Chevaline was the eventual codename given to this major warhead up-date which began in 1969 under the title Antelope. Its purpose was to insure the continued ability of the Polaris A-3 missile to penetrate the Soviet anti-ballistic missile (ABM) defenses around Moscow. For a nation with a nuclear capability as small as Britain's and which has as a basis for its deterrent strategy threatening hostile cities and populations, the ability to attack a potential enemy's capital is essential. In the case of Russia, Lawrence Freedman says:

those ruling the Soviet Union value Moscow far above any other city not only because this is where they reside, but also because in a society as centralized as that of the Soviet Union the disruption caused by the loss of Moscow would far outweigh the loss of any other centre. [Ref. 5: p. 47]

Faced with the sixty-four missiles of the Galosh ABM system deployed around Moscow and the tactical limitation of only being able to deploy at times a single SSBN, the British threat is severely diminished by the real possibility that the Soviets could stop or seriously blunt an unsupported British strategic strike against Moscow. To overcome this perceived limitation, two approaches were seriously considered. The first involved purchasing the Poseidon missile with its 12-14 warhead MIRV capability from the United States. The other was to redesign the Polaris A-3 warhead itself to employ state-of-the-art technology to increase the probability of penetration.

The latter course of action was eventually chosen primarily for political reasons: "it would not require a major - and public - purchase of (new) missiles from the United States and would not involve MIRVs," with their attendant problems of vertical proliferation. [Ref. 5: p. 50]

Chevaline was first officially described by the British Defense Secretary, Francis Pym, in a speech to the House of Commons on 24 January, 1980, as:

> a very major and complex development of the missile front end, involving also changes to the fire control system. The result will not be a MIRVed system. But it includes advanced penetration aids and the ability to manoeevre the payload in space. [Ref. 23]

The technical details of how Chevaline changed the Polaris A-3 warhead remain shrouded in the official secrecy endemic to British strategic systems. The most commonly mentioned configuration is that of six warheads of 40kt each, although three warheads of that yield with additional penetration aids are as likely a possibility. [Ref. 5: p. 49] The Chevaline warhead remains a MRV but with a larger 'footprint.' Employing a maneuvering post-boost bus similar to those used with MIRVed systems, the Chevaline releases its warheads at the same target. These then descend toward the target along a spiral path achieved by either displacing the center of gravity of the reentry vehicle or by adding gas generators and control surfaces to it. This manuevering and corkscrew ability is designed to complicate the task of the limited anti-ballistic missile defense around Moscow. [Ref. 27: p. 5] Lawrence Freedman cites the following as technical details of Chevaline:

1) The ability to change course, angle of reentry into the atmosphere and the speed of descent so as to confuse the defence.

2) Early separation before arriving within the range of defences.

3) Inclusion of penetration decoys in the reentry package.

4) Hardening of the warhead's electronics against the effects of close-in nuclear bursts.

These improvements to the Polaris A-3 are generally believed to greatly enhance its viability into the 1990s. [Ref. 5: p. 49]

The first British Polaris SSBN, HMS Resolution, began her first operational patrol in June 1968, after a 4 year building and work-up period. [Ref. 4: p. 25] Her sisters Repulse, Renown and Revenge joined her over the succeeding two years. A fifth planned ballistic missile submarine was cancelled in 1965 by the Labour government, partly in response to national economic pressures and partly in deference to the party's prior campaign rhetoric about abandoning the British nuclear deterrent. [Ref. 24: p. 25] This sop to domestic political pressure was to have a significant impact on the ability of the Royal Navy to maintain a credible national deterrent at sea over the following decades.

The original force figure of 5 SSBNs was decided on to guarantee that at least 2 Polaris ballistic missile-firing submarines with a total of 32 missiles (16 x 2) would always be at sea. This would allow 32 separate targets to be threatened by 96 warheads with a collective destructive yield of some 1.9 megatons. With only 4 units finally constructed, there are now periods, given scheduled and unscheduled maintenance requirements, when only a single missile boat is available on station to carry out a strategic deterrent patrol. [Ref. 3: p. 558]

Like their American counterparts, each British SSBN has two crews enabling it to be on patrol for 7 weeks in any 12. [Ref. 4: p. 27] What prevents the attainment of a higher percentage of deployed strategic assets is that each of the

boats must be withdrawn in rotation, for long refits in the naval dockyard at Rosyth, where the nuclear power core must be renewed. Originally thought to take about 6 months to accomplish, it became apparent that a longer period, typically 12-13 months, was needed to complete this extended refit. [Ref. 4: p. 27] This 'fueling' has proven to be the critical constraint on the availability of British SSBNs. Present experience shows that the useful life of the reactor cores in the British Polaris boats is about 4 years. Thus for 1 year in every 5, each SSBN will normally be out of service.

It is also apparent that unpredictable disruptions to this normal maintenance cycle could have a disastrous effect on the ability of the Royal Navy to keep a credible deterrent at sea. It is not inconveivable that one of the British SSBNs could be lost while at sea through clandestine hostile action, an accident or equipment failure, or even through an error in judgement. Domestic turmoil could also affect the deterrent force, although to a lesser and more temporary degree. Commenting on strained working conditions in naval dockyards, primarily related to pay disputes and the loss of skilled labor to private industry, a senior officer called the situation "extremely serious." The Navy's refitting schedules for general purpose forces have fallen badly behind at times. Even the Renown, one of the Polaris boats, was delayed completing Rosyth for six weeks. This was the first time that the efficiency of the British strategic deterrent had been so affected. [Ref. 25: p. 5]

In short, the loss of a single British SSBN, for whatever reason, will mark the end of that force's deterrent sufficiency. The present deployed British deterrent has no margin for error. Without 4 operational units there will eventually be periods when no SSBNs are on patrol. Although extraordinary efforts in men and material might overcome such a catastrophe in the short-term through 'surge' capacities, these can at best be stop-gap, ad hoc measures. British governments have been gambling against the hazards of the sea for seventeen years since Harold Wilson's decision to cancel the planned 5th ballistic missile submarine. [Ref. 4: p. 560] There is apparently no action contemplated to change this situation during the projected life of the present fleet.

The basis of the present British nuclear deterrent is the maintenance of a sufficient number of constantly deployable units. While this force remains subject to the unpredictabal vagaries of the sea and the domestic and international political environments, it remains in British eyes a credible threat so long as a single SSBN can be maintained constantly on patrol.

What is more evident and no less threatening to the maintenance of this nuclear retaliatory capacity is the period of useful service life built into the submarines themselves. The principal concerns in this area must be the resiliency of the submarine pressure hull and the reactor core of its nuclear propulsion plant.

Most of the major components of a submarine are relatively easy to replace in whole or in part. Pumps and motors, turbine assemblies and even larger parts of the reactor itself can and must be removed for inspection, repair or replacement. Ship and weapons control equipment, main shaft bearings and even propellers can be worked on without significant impact on the life expectancy of an operational unit. This is not true of a submarine's hull. It is a single, integral unit to which all the other components are fixed and which must protect them from the hazards of the environment in which they operate. A single weak point can threaten the safety of the entire boat and all its onboard systems.

Two essential factors in evaluating the limits of hull life expectancy are static collapse pressure and cyclic loading. Submarine hulls are designed to withstand hydrostatic loads in a stable condition at depths greatly exceeding those in which they normally operate. Additional dynamic stresses are placed on a pressure hull during its operational service due to the changes in depth required by local circumstance and mission requirements. These stresses are known as cyclic loading and vary greatly with different speeds, depths, angles of dive, etc. While determining the 'crush' depth of a pressure hull design is a relatively straightforward calculation, development of its cyclic loading requirements presents different problems. With a submarine subject to perhaps 10 million different cyclic loads during

20 years of operational service, it is necessary to maintain an accurate depth profile for comparison to determine the extent of hull fatigue caused by this phenomenon. [Ref. 26: p. 187]

Submarine design criteria maintain wide margins of safety in engineering standards. The methods used to measure cyclic loading stresses were insufficiently advanced at the time to have any valid input into the construction of the British Polaris fleet. It may be reasonable to assume that the original estimates of hull fatigue problems due to cyclic loading have been very conservative and that given the rather rigid refit schedule and high level of material maintenance conducted, the four ballistic missile submarines could easily exceed their estimated life span of twenty years by 25 to 50% (5-10 years). Ian Bellany talks of "the undemanding patrol schedules which extend the hull life of the SSBNs but which reduce on-station times below what could be achieved." [Ref. 29: p. 8] It is generally acknowledged that the Polaris force will exceed its hull life expectancy by a minimum of five years. It is quite possible that this expectancy could be extended even further, depending on the number, frequency and severity of the hull fatigue problems uncovered and the type and quality of the remedial, corrective action taken on these defects. [Ref. 26: p. 188]

In this vein, deployment patterns could be modified to minimize the metal fatigue induced during operational patrols.

SSBNs could establish patrol areas closer inshore to the British Isles where ASW protection would be more readily available and the depth and transit speed requirements of North Sea and North Atlantic operating stations would not be as great.

Problems with hull welds, equipment vibration and metal irradiation can also be anticipated when discussing the long-range aspects of pressure hull fatigue. To date, however, inspection and monitoring techniques have enabled these potential trouble areas to be easily identified, isolated and corrected. There is no reason to suspect that any of these areas will seriously jeopardize the operational life of any submarine. As Neville Trotter puts it, "there is unlikely to be any dramatic hull failure... but systems can be expected increasingly to cause trouble." [Ref. 28: p. 1]

The requirement to renew nuclear reactor fuel cores each four years is the determining factor in the Britain Polaris boats refit schemes, but there is no evidence to suggest that in the long run, this area will be the critical variable that will determine useful service life. The Royal Navy is developing a new submarine reactor due to be available around 1985 which can be fitted into the existing Polaris boats during a normal refit cycle. At the 18-20 year point of service the presently installed nuclear reactors may have to be replaced; but this can be done on all the Polaris boats for less than half the estimated cost of one new missile submarine. [Ref. 27: p. 5]

The question of material obsolescence is not limited to the submarines themselves, but applies equally to the delivery vehicle, the Polaris A-3 submarine-launched ballistic missile. The Royal Navy apparently procured between 102 and 120 of the Lockheed-manufactured missiles from the United State. Around a dozen launches have been made from British SSBNs utilizing the facilities of the U.S. Atlantic Test Range (ATR) in the waters of the Atlantic and Caribbean off Cape Canaveral, Florida. These were generally conducted following each submarine's service acceptance and during the Chevaline Polaris Improvement Program of the 1970s.

One of the problems the British face with the Polaris A-3 missile is that it was purchased from the Americans, and remains dependent to a large extent on that source for its continued political and logistical support. The U.S. Navy plans to withdraw the last of its 10 remaining Polaris missile boats from service in the 1984-1985 time-frame. At that point this leg of the U.S. deterrent Triad will be made up exclusively of Poseidon and Trident-equipped SSBNs. The Polaris assembly line was closed down in June 1968 after a total production run of 1409 missiles of all three variants (A-1/2/3) [Ref. 26: p. 195] A large stockpile of replacement missiles and major component parts is already in the United Kingdom and an agreement exists between the U.S. and Britain regarding logistics, routine maintenance and cycle overhaul of the Polaris missiles.

While there appear to be sufficient quantities of the major components needed to sustain the Polaris in active service for the foreseeable future, there is a good deal of concern about the continued reliability of the missile's rocket motors after the U.S. Navy's requirements expire. The Polaris A-3 is a two-stage, solid propellant ballistic missile. The first stage motor developed by Aerojet consists of a polyurethane/ammonium perchlorate propellant, while the second stage, manufactured by Hercules, uses a nitrocellulose/ nitroglycerine/ammonium perchlorate mixture. In both stages the propellants are cast into annular sections which are packed inside the rocket motor casing. These solid propellant motors have to be purchased from the United States since facilities to manufacture propellant castings of the size required by the Polaris do not exist in the United Kingdom. [Ref. 26: p. 195]

Under normal operational conditions, the shelf-life of the rocket motor propellants is estimated to be about 5 years; after this period there is an increasing probability that it may deteriorate rapidly or otherwise become unreliable. There is also evidence to suggest that storage of the missile propellants at a stable refrigerated temperature of 5 degrees (Centigrade) can more than double their shelf-life. [Ref. 26: p. 195] If this were the case, the Polaris A-3 missile rocket motors could likely remain operationally reliable into the 21st Century.

Several other options are available to maintain a satisfactory supply of reliable rocket motors for the British Polaris missiles. One would assume that the British could purchase the latest components produced for the U.S. Polaris A-3s when those missiles are taken out of service. It might also be possible to keep open the rocket motor production lines after the U.S. requirement ceases. This would undoubtedly be a costly proposition for which the United Kingdom would have to bear the entire expense. It might also require the political assistance of the United States government as the manufacturers are American. Having offered Poseidon and then Trident, and with its own concerns about modernization, standardization, targetting and unit costs, the U.S. government's reaction to this request is unpredictable.

The other alternative is for Britain to build her own rocket motor production facilities, cost being the paramount drawback. Britain possesses the technical and industrial capacities to accomplish this task if cooperation can be effected with the U.S. manufacturers. Until now it has been more advantageous to procure from the Americans, but that source will probably end production in the early 1980s. If the British were to produce their own propellants, they would also need to establish a more vigorous testing program to insure reliability, which would at once increase the cost and probably require the cooperation of the U.S. for the use of its ATR facilities. While either of these options is certain

to be costly, each is much less so than any of the other strategic alternatives presently being considered. Additionally, the construction of a domestic munitions facility capable of casting rocket propellants large enough for Polaris would help to furnish greater independence for the British strategic deterrent.

If there is a limit when irreplaceable components of the British Polaris force will reach material obsolescence, there is also a point where this deployed strategic deterrent will, for technological reasons, no longer be able to adequately perform the missions assigned to it. Ian Smart puts it this way:

> it would be extraordinary to expect any major strategic weapon system, in the modern world, will retain its effectiveness, in the face of countervailing technical improvements, for longer than a quarter of a century. [Ref. 4: p. 2]

This technological threat primarily concerns delivery platform survivability and payload penetration and effectiveness.

How vulnerable is the British ballistic missile submarine force to hostile interdiction? At present there is no reason for serious concern. The vastness of the ocean continues to offer more shelter to the hunted than to the hunter. [Ref. 3: p. 559] In addressing this question in rationalizing the Trident decision, Defense Secretary Francis Pym said:

> The sea is vast and opaque, and only a dramatic breakthrough on a large scale could give the Soviet Union realistic hope of being able to count on destroying our submarines on patrol at a time of Soviet choosing. The likelihood of this is remote. [Ref. 1: p. 12]

Anti-submarine warfare (ASW) combines the use of aircraft, ships, submarines and shore-based command and control and intelligence processing facilities to achieve its maximum effectiveness. The Soviet investment in ASW forces is massive, and it continues to grow. Farook Hussain suggests that Russian ASW operations against NATO submarines would be successful only about 10% of the time, whereas NATO forces might find the the Russians three times that often. [Ref. 26: p. 188] This evaluation may be a piece of mirror-image deception on the part of Western analysts who see in Soviet ASW groups the same criteria and patterns of operation that characterize Western procedures. Russian ASW forces appear to be optimized for the localization and attack phases of ASW operations and appear to be excellent at this task. To be effective, however, they need accurate, time-sensitive initial datum information on which to respond.

The Soviet Union has demonstrated vital concern over threats to its territorial sovereignty and political control. The development of an effective Soviet anti-carrier warfare (ACW) doctrine, centered around long-range Soviet naval aviation and large surface combatants like the Kynda and Kresta I class rocket cruisers, was clearly linked to the deployment of U.S. carrier-based strategic strike aircraft. This same type of linkage can be inferred from the construction of substantial numbers of large Soviet ASW ships to counter the deployment of Western ballistic missile submarines.

Included in this category are the Kara and Kresta II class cruisers, the large ASW ships of the Moskva and Kiev class, the Krivak class destroyers and several classes of nuclear and diesel-powered submarines. It is realistic to argue that the strategic striking power deployed by Western navies, first in carrier strike aircraft and later in ballistic missile submarines, was directly responsible for the dramatic growth of the Soviet Navy, which was required to assume a larger role in the damage-limiting strategy of the Soviet Union's armed forces.

While the Russians clearly attach a high priority to achieving an effective ASW capability, the forces required to carry it out are generally large and observable. The command and control links involved in such operations are considerable and are subject to intercept and analysis. These factors allow various countermeasures to be initiated to offset the potential risks posed. Patrol areas for SSBNs can be adjusted without interfacing with the deterrent mission. Friendly assets can be used to interdict Soviet forces threatening our own. Additionally, even when in close proximity, submarines have a natural advantage in avoiding detection. [Ref. 29: p. 8]

This does not imply that the field of ASW is static. In fact, Jonathan Alford argues that "there will be a slow, though possibly marginal, shift in favor of the ASW forces." Submarines will become quieter and be less susceptible to

active sonar detection because of improved anechoic hull coatings. The use of decoys and escorting surface ships and submarines to deceive hostile units will be increased and the use of improved degaussing equipment will make magnetic anomaly detection (MAD) by ASW aircraft much more difficult. [Ref. 30: p. 23]

On the other hand, the tools available to ASW forces will also increase in numbers and effectiveness. Sonars will improve, especially in the passive area. Command and control functions will continue to be streamlined, helped especially by increasing trends toward miniaturization and computerization. The biggest potential for a significant ASW breakthrough, however, lies in the area of non-acoustic sensors. The use of satellite detection systems with infra-red capabilities is presently being explored to see if it is feasible to track SSBNs by measuring the difference between the temperature of a submarine's wake and the surrounding water. [Ref. 30: p. 23]

Although Neville Trotter notes that "the present (British) boats, with their relatively high levels of noise, will be at an increasing disadvantages in avoiding detection," he goes on to say that "a breakthrough in (ASW) technology during the life of the next generation of submarines is regarded as unlikely." [Ref. 28: p. 7] In spite of the considerable research and development energies which continue to be funneled into the area of ASW by both the Soviets and the West, there appears to be little evidence that any

technological breakthrough is likely in the near term that would turn the oceans into merely a 'glass of cloudy water,' stripping away the best weapon a submarine has - concealment.

Even though the survivability of the British SSBN in its strategic deterrent role is high indeed, there are some actions which the Soviet Union could take to increase the probability of successfully neutralizing them. This is particularly important to a nation such as Britain which can not afford the loss of even the smallest portion of it without the loss of its entire strategic deterrent credibility. The principal threat is the trailing nuclear attack submarine (SSN). [Ref. 26: p. 192]

Trailing a ballistic missile submarine means that potentially hostile enemy units, usually a submarine but possibly surface ships or a combination thereof, pick up an SSBN as it leaves its operating base for a strategic deterrent patrol and remain with it for the duration of that on station period. The 'trailer' is prepared to destroy or disable the SSBN on orders from higher command, or in the case of any distinct, theatening actions before it can launch a preemptive or retaliatory strike on the Soviet mainland. Theoretically straight-forward, the tactical accomplishment of this mission is difficult.

A surface ship in the trailing role, subject to the vagaries of the elements, would be hard-pressed operating independently, to keep up with an SSBN determined to lose her.

A hostile submarine is subject to "de-lousing" techniques carried out by friendly forces to insure that departing SSBNs are 'clean' of any unwanted escorts. Evasive action and interference maneuvers can serve to free British Polaris boats from sonar surveillance if it is achieved. Active sonar puts the trailing enemy units just as much at threat as the SSBN they are tracking. The problem of maintaining command and control links to headquarters ashore is the same for the trailing submarine as it is for the SSBN. Once contact is lost on a ballistic missile submarine, it much more difficult, even impossible, to regain again.

The major problem the Soviets have in establishing an effective SSBN trail program is their number of nuclear-powered attack submarines. They simply do not have enough to cover all the potentially deployable French, British and American units; and although they have a vigorous on-going construction program, it will be a long time before they can deploy the numbers necessary to effectively counter all the Western ballistic missile submarines. They do retain the capability, however, to attempt to selectively trail a smaller number and possibly could do so effectively. This could have potentially disastrous consequences for the British ballistic missile force.

Given the nature of the superpower strategic balance and European doubts about the credibility of the American nuclear guarantee, it seems likely that the Soviet Union will continue

its attempts to drive a wedge into the question of 'linkage' between actions in Western Europe and the U.S. strategic retaliatory force. As a result, there may very well be an increase in Soviet ASW directed against the European strategic deterrent forces, especially after the new long-range American SLBMs quadruple the area and the problem for the Soviets to achieve effective ASW capabilities. If a political 'de-coupling' ever occurs, the ballistic missile forces of the French and the British are in substantially more jeopardy than when they were more convincingly tied to the American response. Given the small margin by which the British deterrent maintains its credibility, it is uncertain that the American political process would allow a retaliatory response to the sinking of a British SSBN, no matter how blatant the manner. This possible scenario should not be overlooked by those who argue that the submarine-based deterrent is the key to Britain's national security.

If the currently deployed British SSBNs remain relatively immune to the massive Soviet investment in ASW and if their continued ability to employ Polaris SLBMs is assured, the credibility of this deterrent force will be minimal unless a reasonable certainty can be achieved that those missiles can penetrate to their targets with sufficient numbers and accuracy so as to effect the desired social and demographic disruption.

The Polaris A-3 is a proven weapons system with an estimated degree of reliability in excess of 80%. [Ref. 26: p. 195] Except for the as yet undetermined potential impact of the rocket motor and testing program difficulties alluded to previously, the Polaris A-3 SLBM is going to launch successfully and strike its assigned target four out of every five times it is fired, unless an effective defense can be mounted against it.

The technology for building a successful anti-ballistic missile (ABM) defense presently appears to exist. Jonathan Alford states:

> It is not so much a question of what each superpower could do as to what each will do...there is little doubt that technology has now reached a stage (mainly as a result of rapid advances in computers and micro-circuitry) where an effective close-in defence against ballistic missiles could be deployed by about 1990. [Ref. 31: p. 22]

Both the Soviet Union and the United States, the only countries realistically capable of fielding an ABM system given the cost and technology involved, have chosen not do deploy this capability to any great degree. The Soviets have the Galosh system protecting Moscow, while the Americans built and de-activated ABM installations near its ICBM silos in Grand Forks, North Dakota. The 1972 ABM Treaty limits both sides to only two sites, each with 100 missiles. Both sides accepted a further limitation in the 1974 Protocol which only allowed a single national ABM deployment site. In addition to these official agreements on ABM limits, there seems to

exist a strong mutual interest for both countries to avoid engaging in unrestrained competition.

The reasons both nations continue to abide by the ABM accords are multiple, but inherent in the situation is the fact that they both see them as being clearly in their best national interests. The Soviet Union apparently perceives itself at a technological disadvantage to the United States in this area, although the gap is probably diminishing. The Americans want to avoid the enormous expense which would be associated with the construction and operation of any anti-ballistic missile system. Both countries are equally cognizant of the tremendously unstabilizing impact a truly effective, deployed ABM system would present to the current strategic balance.

As long as the superpowers remain committed to maintaining the existing ABM treaties, smaller nuclear powers like Britain will continue to get a 'free ride' on the back of this ABM restraint. As their deterrent effectiveness depends on the ability to threaten targets of 'value' to the enemy, the lack of an effective Soviet anti-ballistic missile defense will increase confidence that a retaliatory strike would be perceived as being able to successfully penetrate to its targets. [Ref. 31: p. 22]

The ABM treaties have limited the deployment of ABM systems but have permitted research and development to continue in this area. In April 1980, the Soviet Union announced that

it was dismantling 32 of the 64 ABM launchers in its Galosh system around Moscow. Why exactly, remains unclear, but Western military analysts believe the Soviet Union "is likely to replace all 64 of its anti-ballistic missile launchers with something equally effective if not better." British Ministry of Defence officials have indicated that the Soviets are "continuing substantial research and development on anti-ballistic missiles." U.S. Secretary of Defense, Harold Brown, in his 1981 Defense Report states:

> the Soviet Union's main concentration appears to be on improving the performance of their large phased-array radars, and on developing a rapidly deployable anti-ballistic missile system which includes a new interceptor. [Ref. 32: p. 1]

It is evident that the subject of ABM defenses is still a fluid one of high priority to the Soviets. There is evidence to suggest that their SAM-5 air defense launchers may be effective in a terminal anti-ballistic missile defense against nuclear attack. [Ref. 26: p. 201] Development is also going forward in areas of exotic technology, such as lasers and charged-particle beam weaponry, but it is unlikely that an effective and comprehensive ABM defense based on these principles can be deployed in this century. [Ref. 31: p. 229]

A minimal ABM system such as Galosh presents a significant threat to as small a deterrent force as the British deploy, if threatening Moscow is considered essential. An updated,

modernized installation could easily cripple any isolated strategic attack by medium powers on the capital. The British Polaris A-3 with its original warhead configuration would probably still be able to penetrate present Soviet defenses around Moscow. The Chevaline modernization program with its sequential warhead release system, developed at a cost of some 1 billion pounds Sterling, is designed to insure that capability is retained against any new defenses the Soviets might deploy in the near term. [Ref. 30: p. 18]

D. SUMMARY

The United Kingdom currently possesses one of the four most powerful nuclear deterrents in the world. The fact that it constitutes only a small portion of the capability deployed by superpowers like the United States and the Soviet Union makes it no less impressive in terms of absolute power. Like the French, the British can still inflict "sufficient" retaliatory damage to the Soviet Union in a countervalue strike to give its deterrent credibility. This doctrine of proportionality, the "ability to tear off an arm," is the raison d'etre behind the British force and despite all the rhetoric given to alliance considerations and American nuclear guarantees, is likely to remain so as long as the British capability continues to exist.

The Royal Navy's ballistic missile submarines of the Resolution class, armed with Polaris A-3 SLBMs remain today

as competent and effective deterrent platforms as the day they were launched. The Polaris Improvement Program (Chevaline) recently completed was designed to ensure the ability of the missile warheads to penetrate existing and planned Soviet anti-ballistic missile (ABM) defenses for the life of the weapon system. If we assume that this is sometime in the 1990s as advertised, it probably will be a successful modernization. Although Soviet ASW capabilities have increased substantially and the age of the Polaris SSBNs is beginning to show, there has been no significant degradation in the level of invulnerability enjoyed by the British boats.

After being initially shut out of the nuclear arena by the United States in the aftermath of World War II, the British have managed to build, maintain and operate an effective nuclear deterrent since. In the 1950s, it was found in the V-bombers and Thor IRBMs of the RAF; in the 1960s, it was still with the V-bombers armed with the Blue Steel stand-off missile; and in the 1970s and 80s, it is carried in the pressure hulls and ballistic missiles of Royal Navy SSBNs constantly on patrol in the far reaches of the North Atlantic and Arctic oceans and the North Sea.

Although always constituting an "independent" national deterrent as regards potential employment, the British force has become increasingly dependent on U.S. transfers of technology to maintain a viable delivery capability. This was highlighted by the cancellation of the Blue Streak IRBM

and Skybolt ALBM projects in the early 1960s. It should be noted that Britain, this delivery vehicle hard spot notwithstanding, has always maintained and continued to advance its ability to domestically produce high quality weapon-grade fissile material; to design and manufacture nuclear weapons of superior technical merit; and to construct suitable types of delivery platforms capable of functioning effectively under vastly different operating conditions, including nuclear-powered submarines and supersonic strike aircraft.

Britain has the intrinsic capacity to completely support her own nuclear weapons establishment, just as France is continuing to do. The opportunity costs of doing so are significant, however, and continue to grow, given the lack of vitality in the British economy. Privy to a 'special relationship' with the United States in the area of nuclear weapons, Britain has chosen to capitalize on this resource to maintain the effectiveness and credibility of her deterrent, rather than devoting other already scarce assets to this task. Although there are always risks associated with international cooperative agreements, the relationship between the United States and Britain on nuclear armaments has been particularly cordial. There is no real reason to suspect this will change as it is still considered in America's best interests to support the British deterrent as an adjunct of that maintained by the United States.

The Polaris ballistic missile is the principal piece of hardware supplied to the British to help maintain their deterrent capability. Its chief drawback is the impact which it has on deterrent strategy. The Polaris, in its A-3 version, is primarily a countervalue weapon, with neither the accuracy nor number of warheads necessary to effectively threaten Soviet strategic forces. Although this strategy would seem to suit a medium nuclear power like Britain, which doesn't have the wherewithal to deploy an extensive multiple warhead system, it would seem more appropriate for the strategy to primarily determine the weaponry, rather than the other way around. This should be a fact of considerable influence in the selection of a more strategically capable system as a replacement for the Polaris.

III. ALTERNATIVE STRATEGIC OPTIONS

The dilemma facing British strategists when they consider the Polaris replacement question is two-fold. First, whether sustaining this strategic nuclear deterrent capability is really in the British national interest and secondly, if it is, to conceive the most efficient method of doing so, given naturally competing bureaucratic interests and national resources.

It is arguable that all too much attention is paid to the mechanics of the British deterrent and not enough to the rationale for it. It is equally true that the best reasons, conceived without the wherewithal to successfully execute them, are useless. If one is to maintain a national deterrent force at all, it must be one which has a reasonably successful chance of carrying out its assigned mission under the conditions for which it was designed to be used. In this age of rapidly advancing technology, to divert increasingly scarce national assets to the maintenance of a capability which is either too much or not enough to achieve the desired result, is a dereliction of the grave responsibilities which governments are embodied to carry out.

If one accepts the premise that the existing force of British Polaris submarines constitutes an effective deterrent, but that its continued viability is limited by approaching

conditions of both material and technological obsolescence, then it becomes a critical necessity to identify, procure and operate an effective replacement system. This section will consider the various strategic options currently available to Britain to sustain her strategic deterrent capability.

A new weapons system rarely embodies state-of-the-art technology by the time it becomes operationally deployed. The time spent in the design and construction of these complex programs cannot keep up with the advancing pace of science and technology. Thus new systems must be constantly projected into the future to enhance their potential viability. What is effective today may still be so tomorrow, but the reverse is equally likely. By the time the British Polaris boats were beginning their first operational patrol, concerns had already surfaced about their ability to penetrate the more sophisticated Soviet ABM defenses then being constructed. This concern eventually culminated in the Chevaline program with its modernized warhead capability. Any new strategic system considered by Britain must also take into serious account what the future might bring, for the option chosen must remain effective well into the 21st Century. Britain does not possess the economic substance nor the political capital necessary to be constantly updating her strategic deterrent force over the period of its likely useful service. What she eventually decides on will mostly likely have to suffice, almost regardless of the changes in technology. Thus the choice becomes that

much more critical with Britain's deterrent capability in the balance. While it may be possible to argue about the rationale of a British deterrent force in the future, if the system chosen to maintain it proves technically unfeasible or obsolete, there is a strong probability that the maintenance of a credible deterrent will be permanently foreclosed.

A British strategic nuclear deterrent force must possess certain systemic features in order to be considered credible. It must be survivable, reliable, effective and affordable, the last feature by no means the least. It is neat and concise to talk in terms of absolutes rather than relatives, but such is not always the case in the political marketplace. Eventually the crucial decisions on deterrence and force levels must be political ones, at least in democracies like Britain. As Lord Palmerston argued in the mid-nineteenth century, in international relations Britain has no permanent friends or permanent enemies, only permanent interests. Little did he realize how widely the range of definition of those interests would be. The point is that in the give and take, pulling and hauling that is national strategy and politics, no way is always the best, even if it eventually is the one chosen. Each has its advantages, but each is likely to subtract something from another aspect of the solution.

In considering strategic alternatives, we must limit ourselves to systems which can strike at a potential enemy's heartland, disrupt his social order and threaten his intrinsic

national values. In the case of Britain, it must be remembered that the actual employment of the deterrent force in a strategic role will mark the failure of that force in its primary mission, to deter the use of nuclear weapons against British national interests. As a weapon of 'last resort,' the deterrent must be able to influence the perceptions of a potential enemy and persuade him not to threaten national sovereignty. The British force should not be scorned at because of its size. It has always been of relatively high quality and its potency is considerable. In evaluating the threat posed by the aging Polaris force Lawrence Freedman points out:

> It should not therefore be thought that because of the comparative size of the arsenals of the superpowers, the missiles contained in even one (British) Polaris submarine do not present a serious nuclear threat. They could inflict a catastrophe of immense proportions on the Soviet people. [Ref. 5: p. 36]

This feature will likely be accentuated in any replacement program adopted by the British. The qualitative aspects will undoubtedly be preserved and the technological advances made should allow a 'bigger bang' for the resources expended.

This section reviews the new strategic options for the British nuclear deterrent and concentrates primarily on the delivery vehicles and launch platforms. Although there are a number of other important, even crucial aspects, we must first understand the hardware involved before we can attempt to analyze the British decision to purchase the Trident I.

A. THE MANNED BOMBER

Although the ability to develop and deploy orbital bombing systems is probably within the technological grasp of the United States and the Soviet Union, it is an area of competition which has thus far been avoided for a number of compelling political and international reasons. Weapons systems generally considered within the scope of international strategic deterrence are those associated with manned aircraft, ballistic missiles; and, in recent times, the cruise missile. Common criteria can be established to measure the effectiveness of each of these different delivery vehicles. Although there may be minor disagreements among individual analysts, the major critical assessments considered are survivability, reliability, penetration, effect and cost. [Ref. 3: p. 564]

In many measurable ways the ideal nuclear delivery vehicle remains the manned aircraft. Its reliability is excellent; it can carry and place on target with precision, huge weapons loads of either gravity-type bombs or short range air-to-ground missiles; and it retains an onboard decision-making capability unmatched among other delivery behicles, which allows them a flexibility of purpose and mission responsiveness that would be otherwise unattainable. The major shortcoming of manned aircraft as a strategic delivery vehicle is its limited potential for survival.

Conventional Soviet air defenses have achieved a level of sophistication that would seriously impair the ability of any

nation to effectively threaten strategic Soviet assets. These consist of first-line interceptor aircraft, interlocking short and long-range surface-to-air missile (SAM) systems and an integrated command and control network that exists throughout the Soviet Russia and its Eastern Bloc satellites. The likelihood that an unsupported attack by manned aircraft could penetrate this air defense umbrella and strike targets of significance is small indeed.

This is particularly true of medium power nations like Britain that no longer enjoy the superiority in aviation technology they once did. While new, sophisticated developments are constantly being made in the aviation industry, like the Stealth bomber in the United States, it is unlikely that Britain will be in any position in the near term to reap any strategic advantage from this progress. She will be unable to commit either the capital or industrial resources to turn such advances to her own purposes, even if they are not quickly overtaken by defensive countermeasures.

If the survivability of manned aircraft in the attack is suspect, so is their ability to ride out a pre-emptive strike by the Soviet Union. Even with the Ballistic Missile Early Warning System (BMEWS) in operation at Fylingdales since 1963 and the close coordination that exists between Britain and the U.S. in this field, there would be little reaction time available for manned aircraft to avoid a calculated, crushing, premptive attack designed to disarm the British deterrent force

and possibly de-couple it from the American strategic guarantee. In this instance, the close geographical proximity which the UK enjoys to the continent works to her distinct disadvantage in cutting down the time available to scramble a manned aircraft retaliation force. If depressed trajectory SLBM firing paths are used, this disadvantage is even further exacerbated. The Soviet Union also deploys considerable numbers of capable ballistic missile submarines. With British early warning systems oriented to the East, the possibility of a 'back door' strike from the North Atlantic must also be considered. Jonathan Alford of the International Institute for Strategic Studies (IISS) puts it well when he says:

> Britain can expect only six to eight minutes of warning of ballistic missile attack from the Soviet Union and, given the lack of all-round early-warning radar coverage, virtually no warning of attack by depressed-trajectory SLBM fired from the Atlantic. [Ref. 30: p. 21]

It is possible to avoid the pitfalls of a surprise preemptive Soviet strike by maintaining constantly airborne nuclear-armed strategic aircraft in sufficient numbers to deter the probability of such a strike. This is, however, a very costly alternative and is particularly hard on the life of the aircraft and support equipment which will be required to sustain the credibility of the deterrent. It also significantly increases the possibility of nuclear accidents, a matter of no small concern in a nation as geographically confined as Great Britain. The potential repercussions of such an incident, given the underlying strength and emotion of

anti-nuclear groups in Britain, could be politically untenable for a government committed to the maintenance of a competent strategic nuclear deterrent. Manned aircraft are not presently viable delivery vehicles for the British strategic nuclear deterrent force and have not seriously been considered in that role.

B. THE CRUISE MISSILE OPTION

A cruise missile is a pilotless aircraft with continuous propulsion and an internal guidance system. [Ref. 3: p. 69] It is descended from one of Hitler's "revenge" weapons, the V-1 'buzz' bomb of World War II. Development of this type of weapon was continued in the 1950s by both the Soviet Union and the United States. The U.S. Navy's 'Regulus' missile program showed promise until it was overtaken by the Polaris successes of the late 1950s. Another U.S. version, the Bomarc, was deployed in remote Canadian locations but differences between the countries over strategic policy prevented it from ever being armed with a nuclear weapon.

It has been suggested that the U.S. cruise missile program of the 1950s was the victim of bureaucratic special interests; and had it been pursued more vigorously, it might have eliminated a crucial deficiency that became apparent in the area of surface warfare during the 1960s and 70s. The fact that the cruise missile was introduced as a strategic system hindered its eventual successful development. With only a

medium range capability, it was first overshadowed by other IRBMs and then by the ICBMs which became the backbone of the U.S. strategic arsenal. Employed in a sea-launched tactical mode, it was touted as a replacement for piloted aircraft, rather than as an extension of the over-the-horizon warfare capability of surface ships. This was clearly a bureaucratic handicap in a Navy dominated by carrier admirals and probably spelled its end under the increasingly tight fiscal constraints of the Eisenhower presidency.

The Soviets, on the other hand, never really attempted to develop a strategic cruise missile. They did design and deploy an impressive, especially for its time, tactical cruise missile capability centered initially on submarines and small surface combatants. This was later extended to the Kynda and Kresta I class 'rocket' cruisers and long-range elements of Soviet Naval Aviation (SNA).

Although crude by today's standards, the Soviet cruise missiles of the 1960s and 70s posed a serious threat to opposing forces. One is credited with sinking the Israeli destroyer Elath during the 1967 Arab-Israeli war, while an even more convincing demonstration occurred during the 1971 Indo-Pakistani conflict when several large Pakistani combatants and merchant ships were sunk by small Indian Navy patrol craft armed with Soviet cruise missiles. The aging technology of these weapons, however, was becoming evident when, during the 1973 Yom Kippur War, missile-equipped Israeli gunboats

successfully countered large coordinated attacks by Egyptian surface craft armed with cruise missiles and then sank most of the attacking forces.

The sudden interest that has been rekindled in the cruise missile as a strategic delivery vehicle is primarily the result of two complementing reasons. First, the technology has finally become available to make the cruise missile a truly viable nuclear delivery system. Secondly, and perhaps more importantly, the cruise missile was not included in the provisions of the SALT I aggreement on offensive arms; and thus when successfully developed would represent a substantive advantage over the Soviet Union, both in terms of actual deterrent value and as a bargaining chip in future arms limitation talks. [Ref. 5: p. 70] The impetus these reasons gave to cruise missile development in the United States were to provide a weapon system that was something considerably more than a conceptual model for British theorists to consider utilizing as a strategic delivery vehicle.

Several new technologies are responsible for overcoming the past disadvantages associated with cruise missiles, notably high fuel consumption, navigational inaccuracies and small explosive payloads. [Ref. 5: p. 69] The strategic versions of the cruise missile incorporate three significantly new technologies - "high efficiency, small (130 lb) turbofan engines; modern guidance systems with micro-minaturized on-board computers and associated terminal guidance systems;

and the new W-80 nuclear warhead, designed to weigh 240 lb, fit into a 10.6 inch diameter casing, and have a 200-250 KT yield." [Ref. 31: p. 243) These advances in munitions, propulsion, high energy fuels and guidance systems allow a cruise missile to pack an effective and potent punch at long ranges. The cruise missiles existing today constitute a step change in capability.

Two versions of the cruise missile are currently produced in the United States - the Boeing air-launched cruise missile (ALCM) and the General Dynamics Tomahawk designed for both ground and sea/subsurface launch. These production models were continued after exhaustive research and development efforts were concluded with a series of fly-offs between competing missiles. The British Secretary of State for Defence, Francis Pym, described their characteristics as follows:

> These can fly long distances - typically over 1500 miles - at very low altitudes (around one hundred feet) and navigate accurately to an aim point, while presenting an exceptionally small target for enemy defences to detect, locate and attack. They do not travel at very high speed - around 400-500 knots - but rely for protection mainly on low altitude, small radar cross-section and evasive routing to avoid known defence concentrations. [Ref. 1: para 35]

Much of the interest in the new cruise missile seems to center on its guidance system which is an integrated combination of inertial navigation and a terrain contour matching grid system (TERCOM) which compares "terrain information, obtained by satellite and stored in a computer on board the

missile, with the terrain detected by sensors on the missile." [Ref. 30: p. 18] Utilizing this system, it is practicable for cruise missiles to achieve an extremely high degree of accuracy over the entire range of their capability. Estimates of how precise this might be vary, but are generally in the 50 to 100 meter range suggested by Jonathan Alford and Desmond Ball, [Ref. 32: p. 15], although James Bellini and Geoffrey Pattie argue that at a range of 2500 miles, a CEP of 30 yards can be achieved. [Ref. 33: p. 39] While this capability is an impressive technical triumph, only the hardest potential targets will justify the lethality of a 200 KT weapon delivered literally to their doorsteps. It may serve to enhance the counterforce capabilities of a superpower like the United States but given the relatively slow speeds of the existing cruise missiles, is unlikely to have any pre-emptive ability. For a country with a counter-value strategy, such as Great Britain, the full spectrum of cruise missile technology available is probably more than is reasonably required to carry out its deterrent mission. The qualitative step increase that new cruise missile weaponry represents may actually lower the nuclear threshold for medium power nations such as Britain, by threatening hard Soviet targets which were previously outside the scope of their capability.

The cruise missile is a serious contender in the British debate over strategic alternatives to the present Polaris

deterrence force. Its principal recommendation seems to be its 'apparent' cheapness and employability, while its supposed vulnerability to Soviet air defenses is seen as a potentially damaging weakness. These general characterizations and their associated offshoots need to be examined in greater detail to develop a better appreciation for the capability which cruise missiles could provide to a British deterrent force.

A broad generalization can be made that if estimated cruise missile costs are approximately one-sixth those of an equivalent ballistic missile, then systemic comparisons should run roughly along the same lines. [Ref. 5: p. 70] This thesis deliberately omits consideration of the manner in which the weapons might be deployed or the number of cruise missiles which would be required to achieve the same effectiveness as a comparable ballistic missile force.

Cruise missiles themselves have the potential to become much more expensive. Testimony before the U.S. Senate Armed Services Committee in March 1977 was "categoric that the cost of the acquisition of topographic data and the digitizing of maps for the TERCOM system was 'extraordinarily greater' than that of the cruise missile itself." [Ref. 31: p. 245] Jonathan Alford of the IISS points out that the costs associated with first generation cruise missiles will rise sharply for subsequent generations. [Ref. 30: p. 19]

If we examine the cruise missile in the light of established criteria, we find it an exceptionally hard system

to categorize, primarily because of its novelty. Ian Smart sees strategic cruise missiles having distinct advantages over ballistic missiles (except in submarines) in terms of survivability and employability. They can be operated from almost any type of launch platform; trucks, surface combatants, fast patrol boats and hovercraft, submarines, and large and small aircraft. But they also have an as yet imprecise operational reliability and a significantly lower ability to penetrate Soviet defenses than their ballistic counterparts. [Ref. 3: p. 566] These facts must be taken into account when calculating how many more cruise missiles must be launched to achieve a given effect.

In a Memorandum prepared for the Defence and External Affairs Sub-Committee of the Expenditure Committee of the House of Commons in March 1979, the International Institute of Strategic Studies assessed the survivability of the cruise missile at 25%. That is, Soviet defenses would knock down three out of every four strategic cruise missiles before they could penetrate to their targets. Given a generally accepted figure of 80% launch reliability for cruise missiles, the resulting combined reliability/survivability factor for the missile after launch is of the order of 20%. Five cruise missiles must be flown in order to get one through. [Ref. 26: p. 89] IISS goes on to assess the survivability of the various launch platforms from which cruise missiles might be employed as follows:

a. submarine (SSCN) ------------------------ 0.8

b. fast surface craft (SLCM)--------------- 0.8

c. ground-launched systems (GLCM) --------- 0.8

d. major surface combatants (MSC) --------- 0.6

e. aircraft (ALCM) ------------------------ 0.4

If these assessments are combined for the survivability of the missile and the vulnerability of its launch platform, the following numbers of cruise missiles must be deployed to cover the minimum twelve targets (given an 80% missile reliability factor) presently threatened by the single Polaris submarine maintained on patrol:

a. SSCN, SLCM and GLCM -------------------- 75

b. MSC ------------------------------------ 100

c. ALCM ----------------------------------- 150

The figures cited above are only theoretical calculations, but do present a relative picture of the problems which face a strategist considering the deployment of cruise missiles as the basis of a national nuclear deterrent force. In a subsequent Memorandum, this one to the Defence Committee of the House of Commons in June 1980, the IISS modified its position regarding cruise missile vulnerability in the following way:

> In the case of radar detection and intercept, we have tended to understate the difficulties of detecting and engaging a low-flying missile with a very small radar cross-section over land. We understand that American tests have shown that, even with the most advanced look-down airborne radar, it is extremely difficult to discriminate between a cruise missile at very low altitude and ground clutter.

The memo goes on to state:

> We may have been somewhat high in our estimates of the attrition to which a cruise missile attack would be subjected. We assessed...the attrition of a British attack (because the enemy defences would be less saturated) at 75%. It would now appear sensible in making calculations of force size and relating those to a given target array to reduce the attrition rate to 60% for the British force...this will have the effect of reducing the number of cruise missiles that would have to be deployed by the United Kingdom and so the capital outlay involved. [Ref. 34: p. 3]

Writing in the Times, RAF Air Vice-Marshal Stewart Menaul says of the cruise missile "its power of penetration cannot be calculated with precision and those who claim that 40 or 50 per cent of cruise missiles attacking targets in the Soviet Union would be destroyed are indulging in pure guesswork."

The point is that cruise missiles represent a new technology. British strategists are reluctant to explore beyond the bounds of familiar territory, like SLBMs. They have the experiences of the Blue Streak and Skybolt to consider, as well as the recently completed Polaris Improvement Program (Chevaline) which suffered significant cost overruns. If the British were to opt for the cruise missile, they would be selecting an operationally untried system and one which does not constitute the main battery of the U.S. strategic nuclear arsenal. The procurement and operation by Britain of more than a single successor system to Polaris is highly improbable for reasons of cost as well as strategic efficiency. [Ref. 4: p. 9] Ian Smart argues that, because Britain must choose only one deterrent system, she "cannot afford the options for

technical experiment." She must chose a 'tried' system of technical reliability - i.e. ballistic missiles. [Ref. 36: p. 23] Cruise missile systems could be easily dismantled by the United States either because of their ineffectiveness or as a result of future arms limitation agreements. To a British deterrence strategy intimately linked to American cruise technology, this could be a devastating blow, one likely to spell the end of any deterrent, independent or otherwise.

There are several undecided issues in determining the feasibility of deploying British cruise missiles as successors to the present Polaris system. David Greenwood hints at the first of these, in noting that "guessing at the terms, financial and otherwise, upon which the Americans might make the missiles available to the United Kingdom is the toughest nut to crack." [Ref. 29: p. 130] Having indicated a willingness to sell the Trident system, the U.S. might be understandably less enthusiastic about doing the same with cruise missiles or their technology. The problems associated with arms limitation talks are real enough, but their immediate relevance appears to have faded somewhat, along with the spirit of detente in which SALT I and II were conceived. The U.S. would undoubtedly like help in absorbing the burden of the Trident system. British participation would help defray those costs and further lower the unit price of each missile. The standardization that would be achieved with

the deployment of similar missiles would assist in targetting and command and control functions. It would also strengthen immeasurably the technical and professional bonds which exist between the United States and Britain and which are the real basis for the continued material and technological support that sustains the existence of an effective British deterrent force.

Studies by both the British government and British Aerospace industries indicate that production of cruise missiles is entirely within the capacity of British industry. The only caveat attached to this judgement is cost. More funds would be required than if cruise missiles and their technology were purchased from the Americans. Development efforts would cost more because British industry will be expanding on a lower technological base, while production costs will be higher because the UK would not be able to achieve any economies of scale with their smaller deployment requirements. [Ref. 26: p. 91] One of the British companies asked to undertake a feasibility study in this area, British Aerospace Dynamics Group (BAeD), comments:

> On the basis of existing UK technology and resources... we are confident that we can develop a cruise missile acting as a prime contractor in a national programme. [Ref. 26: p. 241]

Interestingly, in response to a question as to the type of system which should be considered as a successor to Polaris, BAeD responds "on the information available to us at present,

we would expect that a ballistic missile system would be the one more appropriate to the needs of the UK." [Ref. 26: p. 242] It should be noted, however, that BAeD is heavily involved in providing the technical support required to maintain the effectiveness of the Polaris system and may anticipate the same role in a successor ballistic missile system.

Another problem with the deployment of a British cruise missile force is the extent to which it would be dependent upon the United States for the topographical data to be attributed to the TERCOM terminal guidance system. If this information flow were obstructed for whatever reasons, the effectiveness of the British cruise missile force would be seriously impaired by the lack of vital targetting data. It also creates "an unwelcome degree of dependence...that does not ride easily with an assumption of ultimate independence." [Ref. 26: p. 83]

This thesis assumes that the British version of the cruise missile will use the terminal guidance features of TERCOM, rather than relying on the accuracy of the on-board inertial system. The question of how useful TERCOM is to a British countervalue strategy has already been raised. The IISS questions whether there is actually a need to rely on satellite information for the targeting of cruise missiles. In a Memorandum submitted in June 1980 to the House of Commons, the IISS suggests that accumulated errors of guidance in inertial systems will allow a drift of no more than 8 nautical

miles per hour of flight. [Ref. 34: p. 3] Speaking less than a month later to the Defence Committee, Jonathan Alford of IISS expanded on this possibility:

> I am now informed that probably I have erred on the side of inaccuracy and simply with inertial guidance, given the technology presently available, one should be able to achieve inaccuracies of as low as one mile per hour's flight and possibly lower than that.

Alford goes on to explore the strategic implications of this possibility:

> In that case you free yourself entirely from satellite information and you could indeed, given the kind of information which we already have available...in terms of mapping, then be able to deliver a warhead close enough - that is a rather qualified statement, but close enough to a desired ground zero at the centre of a Soviet city. [Ref. 32: p. 12]

If an inertial system were to prove satisfactory for cruise missile guidance, it would also generally eliminate the need for the use of the radar altimeter, TERCOM's most important sensor, but also the one which is most detectable by enemy defenses and which would be vulnerable to degradation by electronic countermeasures (ECM). [Ref. 30: p. 18]

There are other disadvantages associated with any projected deployment of British cruise missiles. The availability of sufficient quantities of fissile material to support the increased requirement for warheads will have to be considered. So will the difficulties of retargeting cruise missiles equipped with either inertial or TERCOM guidance systems and assigned to the Single Integrated Operation Plan (SIOP) directed from SAC headquarters in Omaha. The low level flight

patterns demanded by the typical cruise missile mission profile could be potentially politically embarassing to the British government because they would generally have to overfly the territory of other allied nations who might not be in total support of this particular type of strategic deterrent system.

The major disadvantage of cruise missiles, however, is their supposed susceptibility to enhanced Soviet air defenses. Just as Britain benefits from the American research and development efforts on cruise missiles, Britain will be disadvantaged by the Soviet Union's predicted heavy investment in an air defense system to protect itself from an American cruise missile attack. The U.S. presently plans to start the deployment of 464 GLCMs throughout the European theater in late 1983. The Soviets will probably concentrate on a perimeter defense based on elevated radars and a combination of 'look down - shoot down' interceptor aircraft and a SAM system with very high rates of initial acceleration. It is believed that the SA-10 SAM system is being optimized for this task. [Ref. 30: p. 20]

If Soviet air defenses have been erected against the threat of a massive U.S. attack with thousands of cruise missiles, they could expect to effect a much higher degree of attrition against a smaller force like the one the British would presumably deploy. Britain can not afford to saturate Soviet defenses with large numbers of cruise missiles like

the United States. Nor is Britain likely to be able to afford the constant updates that may be required to keep the cruise missile's penetrability ahead of cruise missile defenses.

The cost to the Soviet Union for such an air defense capability will be enormous and the absolute cost of continuing to guard against a cruise missile threat will be much greater than that required by the United States to sustain it. The Economist, in an editorial titled "Don't Forget the Cheap One," points out that one can deal with improved Soviet air defenses by simply buying more cruise missiles: "the core of the matter is that, with cruise missiles, the cost-benefit advantage lies with the attacker: it is cheaper and easier to improve the missiles than the defensive system that has to swat them off." [Ref. 37: p. 20]

Cruise missile technology is in its infancy and will likely advance to later generations. These newer models will have higher, even supersonic speeds; greater 'ground-hugging' capability; improved terminal guidance packages; and advanced penetration aids and electronic counter-counter measure-abilities (ECCM). [Ref. 26: p. 19] New anti-radar coatings and minor design changes have reduced the radar-reflecting surface of the Tomahawk missile to roughly the size of a soccer ball. [Ref. 37: p. 20] Even further advances in the area of anechoic coatings are likely, as is the incorporation of 'Stealth' technology in the design and production of future versions of the cruise missile. As the Economist

editorial concludes, "a cruise missile travelling at treetop height at 3000 mph - a speed within technological reach - bids fair to be at least as tough a target as a ballistic missile." [Ref. 37: p. 20]

Ian Smart has argued that, if cruise missiles are deployed as successors to the Polaris force, they should be carried on submarines to maximize their chances of survivability. Given the factors generally attributed to cruise missiles, a force of 17 boats, each armed with 24 SLCM would be required to provide the deterrent capability of 5 SSBNs, each armed with 16 ballistic missiles. He concludes that "cruise missile submarines, cruise missiles themselves and their warheads would be cheaper to develop than their ballistic missile counterparts." but "the total construction costs for the SSCN/SLCM force would exceed those for the SSBN/SLBM option as would annual operating and maintenance costs (because of the larger number of submarines involved)." [Ref. 29: p. 142]

One aspect of cruise missiles not often considered is their ability to function in a tactical as well as a strategic role. With guidance systems capable of virtually 100% accuracy, they could play an effective, perhaps even dominant role in a theater nuclear force (TNF). Stewart Menaul argues that this is one area where the 'dual' theater and strategic strike capabilities of the cruise missile give it clear ascendency over ballistic missile systems in general, and the Trident in particular. [Ref. 38] Bellini and Pattie

make much the same argument in their 1977 work on medium powers, going so far as to call the cruise missile, Western Europe's strategic option. The important difference is that they see the cruise missile armed with a conventional warhead (but employed in a strategic mission) as bridging the gap between conventional and nuclear warfare. [Ref. 33: p. 40]

The strategic cruise missile option is not an ideal solution to Britain's problem of Polaris replacement, but it is a relatively cheap one, an increasingly crucial factor when considering the maintenance of sufficient numbers of balanced general purpose forces to support the level of conventional and TNF deterrence required. Of equal importance is the fact that the manufacture of cruise missiles is entirely within the capacity of British industry. Henry Stanhope, Defence Correspondent for the Times, reports that "secret trials of a cruise missile, fitted with an all-British terrain-following navigation system which could guide the missile to its target without depending on American satellites, are understood to have been successful." [Ref. 39: p. 1]

The cruise missile is not a panacea to the British strategic dilemma. It has many disadvantages, chief among them its potential vulnerability to sophisticated air defenses, a problem exacerbated by the small size of any future British force and the huge Soviet air defense investment in response to U.S. plans to deploy thousands of ALCMs, SLCMs and GLCMs over the next decade. If the enhanced Soviet air defense

capability is not totally effective against the American threat, it certainly will effect a much higher attrition rate against an unsupported attack by British cruise missiles.

In spite of this, the cruise option does present a viable strategic alternative, especially when paired with relatively inexpensive launch platforms such as mobile lorries with transporter/erector abilities (TER), hovercraft and fast patrol boats. Higher probabilities of survival can be attained with more secure launch platforms, such as submarines, but the costs escalate proportionally. In choosing a successor system, one must look at its potential for effective service during the period of its intended employment. The present Polaris force will suffice into the 1990s, so what we are contemplating is a capability that will retain its deterrent effectiveness well into the 21st Century. Cruise missile technology is still young and there is every reason to believe that it will continue to advance with time. To foreclose the possibility of employing a potentially competent system, in favor of one currently possessing superior strategic characteristics but which will be increasingly vulnerable by the time it is deployed, may prove to be a 'penny-wise, pound-foolish' concept. This is particularly worrisome, given the enormous expenditure that deployment of a replacement ballistic system will entail and which may, in fact, prove fatal to balanced defense spending as Britain attempts to maintain an effective national deterrent force into the forseeable future as well as credible conventional forces.

C. BALLISTIC MISSILES AND SUBMARINES

As has already been established, the cruise missile, one of the principal strategic delivery vehicles presently being developed and deployed, is a direct descendant of Germany's World War II V-1 'buzz' bomb. It was the V-2 ballistic missile, however, the second of Hitler's 'revenge' weapons, that was to spawn the progeny that came to occupy the central place in the arsenals of the superpowers in the post-war era. [Ref. 5: p. 69]

A brief comparison of these two early German rockets provides a revealing insight into the merits of each as they are being argued at the present time. The V-1 was comparatively unsophisticated and therefore less expensive and more efficient. In actual operation, however, it proved to be highly susceptible to an effectively integrated air defense network. [Ref. 30: p. 20] The V-2 ballistic missile, on the other hand, could easily penetrate British defenses, but because of its complexity was an enormously expensive weapon to procure and use. [Ref. 5: p. 69]

Today's cruise missiles, while hardly unsophisticated, are being touted for their 'cheapness.' Their perceived weakness remains, as it was in the latter stages of the Second World War, their supposed vulnerability to active enemy defenses. The intercontinental ballistic missiles currently being deployed by the superpowers are able to penetrate to their potential targets with near impunity, but

their expense and complexity places an enormous burden on the scarce monetary, technical and personnel resources of even the wealthiest of nations. Although the V-1 and V-2 rockets utilized conventional high explosives which can't really be compared to the effects of the huge thermonuclear warheads in today's nuclear arsenals, the lessons which they provide should not be overlooked in the contemporary context.

Ian Smart describes ballistic missiles as: "powered by rocket motors burning liquid or solid fuel...designed to send a module containing a nuclear warhead into a ballistic trajectory, commonly reaching its apogee outside the atmosphere, from which the module (known as a reentry vehicle) returns to the atmosphere on a path which will bring the weapon (known as a warhead) to a predetermined target." [Ref. 4: p. 43]

Smart considers several pertinent points in determining the suitability of a ballistic missile for use as a nuclear delivery vehicle. The first is reliability. Because of their complexity, ballistic missiles demand the establishment and maintenance of higher production control standards, but as he puts it, "the corollary is that, given such high standards, they may be very reliable indeed." This fact is reenforced by the rigorous testing and monitoring procedures being carried out for operationally deployed systems. The Polaris missile has reportedly achieved a 99% readiness rate for combined American and British operational patrols. [Ref. 4: p. 47] While the basic rocket motors and guidance systems

of long-range ballistic missiles only have to perform satisfactorily for about five minutes before the reentry vehicle is released into its free ballistic flight, the very speeds associated with ballistic missiles are likely to amplify even minor malfunctions in the propulsion motor or guidance system and produce dramatic deviations with little time or room for correction. [Ref. 4: p. 47]

Penetrability is the second of Smart's salient attributes and probably the single strongest point favoring ballistic missiles. They have a "high penetration capability,...are currently only vulnerable to specialized anti-ballistic missile (ABM) missile systems (deployment of which is strictly limited by SALT agreements) and, even against such defences, offer a significant probability of reaching their targets." [Ref. 4: p. 47]

Another point which Smart makes in his consideration of the ballistic missile is its effect. A ballistic missile because of its size and throw-weight may carry several nuclear warheads and, if it is sufficiently sophisticated or MIRVed (multiple independently-targetted reentry vehicle), direct them towards an equal number of widely separated targets. In terms of the number of targets on which an effect may be produced by a single delivery vehicle, ballistic missiles, as a type, have a potentially greater advantage than others which can only carry a single warhead, or in most circumstances, attack a single target. [Ref. 4: p. 48] The British Polaris

missile for example, even though of the ballistic type and armed with more than one warhead, lacks the sophistication to attack more than a single, area target.

Neville Trotter outlines some of the specific advantages of British submarine-launched ballistic missiles as follows: they take only a few minutes to reach their targets; are very difficult to intercept; can be fired in very fast sequence; can carry a number of warheads which can be both independently targetted and manuevering; and generally when on operational patrol are located far from centers of population and thus, in themselves, do not invite a first strike on Britain. Specific disadvantages which Trotter indentifies with SLBMs include the greater inaccuracies associated with sea-based navigational positioning systems, which has a minimal impact on Britain's counter-value targetting strategy, and the command and control difficulties inherent in establishing reliable undersea communications. [Ref. 26: pp. 121-122]

1. Launch Platforms

The reliability, penetrability and potential destructive effect of the ballistic missile and its associated reentry vehicle and weapons package, make it almost the 'perfect' delivery vehicle for nuclear weapons, once it has been launched. The principal disadvantage of ballistic missiles is the vulnerability of their launch platforms to damage and destruction by a pre-emptive first strike. To any nation whose national security strategy is ultimately based on its

ability to successfully conduct an unacceptably damaging retaliatory second-strike on potential aggressors, the ability of its own nuclear strike force to survive a pre-emptive attack is the real measure of the credibility of that deterrent.

Ballistic missiles are generally speaking larger, heavier, bulkier and more awkward to move around than other types of nuclear delivery vehicles. These facts tend to make them harder to hide and therefore protect, given the state of intelligence technology and nuclear strike capability that is currently available to the superpowers. In considering the technical requirements for a British replacement for the Polaris, Ian Smart cites only five types of launch platforms worth considering: static land bases; mobile land bases; manned aircraft; naval surface vessels; and submarines. [Ref. 3: p. 564] In any consideration of these launch platforms, the same advantages and disadvantages do not necessarily accrue regardless of the type of delivery vehicle being discussed. There are differences in scope and application and these salient points will be emphasized.

Ian Smart considers the alternative launch platform options available in the following manner:

> Land-based systems are always likely to rank relatively low in terms of survival...they are difficult, if not impossible, to conceal from aerial or satellite surveillance or to protect from a pre-emptive nuclear attack. Mobile launch platforms mitigate that weakness, but only to a limited extent...land-based ballistic missiles, whether or not in underground silos, are likely to be more vulnerable than land-based cruise missiles,

> because of their larger size and lower potential mobility... Manned aircraft...and their land bases are, in many respects, the most vulnerable targets of all. Unless they are kept in the air, on 'airborne alert' (which is very expensive), their ability to survive depends upon their being able to get enough warning to get them off the ground and away from their bases before the attack arrives...Sea-based launch platforms generally tend to have a higher survival potential, because of their mobility and their opportunities for concealment. Clearly, this advantage reaches a maximum in the case of submarine launch platforms. [Ref. 4: pp. 45-46]

Writing in a different publication, Smart is more specific: "ballistic missiles in static land bases, in manned aircraft or in naval surface vessels are not... worth serious attention in the British case, largely on the grounds of survival, but, especially in the case of manned aircraft, also on the grounds of cost...if the delivery vehicle is to be a ballistic missile, therefore, the chances are that, like Polaris, it will have to based on a submarine." [Ref. 3: p. 565]

In the early years of the Cold War, Britain, by virtue of her geographical proximity, enjoyed a distinct strategic retaliatory advantage in being able to strike with her bomber forces at the heart of the Soviet homeland. In the contemporary context that advantage has now been reversed and it is Britain which lives in the shadow of Soviet missiles. In a Memorandum submitted to a Parliamentary sub-committee, Neville Trotter pointed out that "although the Russians continue to talk of detente their strategic nuclear arsenal continues to grow and they now outstrip America both in the number of delivery

vehicles and in destructive force." [Ref. 26: p. 119]

Speaking directly to the British threat, Trotter says:

> The huge Russian strategic force is aimed at America but part could be targetted on Britain and undoubtedly we are the target for some of the 690 IRBMs and MRBMs whose range would not enable them to reach America. Recently Golf class SSBs have moved for the first time from the Northern Fleet to the Baltic and from there Britain is within the 700 mile range of their missiles. The Soviet Long Range Aviation force has a growing number of formidable supersonic Backfire bombers armed with AS4 or AS6 missiles. From bases in the Arctic these aircraft can attack Britain from the Western Approaches. In the last few years there has been a dramatic increase in the range and payload of the tactical aircraft of the Soviet Frontal Aviation... it now possesses for the first time the capability to strike Britain from its bases in East Germany. [Ref. 26: p. 119]

Concluding he stresses "we could thus be attacked with tactical rather than strategic weapons. If there was no likelihood of a retaliatory attack one could envisage circumstances when as part of the battle for Europe, such an attack on Britain could take place." [Ref. 26: p. 119] Implicit in this statement is the fact that in the event of a full-fledged European conflict, Britain would be a major staging area for conventional reenforcements and thus a high priority target.

Trotter does not even address himself to the serious threats posed to Britain by the SS-20, a highly accurate, MIRVed IRBM currently being deployed in Eastern Europe or the 'depressed-trajectory' submarine-launched ballistic missile (SLBM) which is optimized for a no-warning strike against a vulnerable British strategic retaliatory force.

Lord Peter Hill-Norton, former First Lord of the Admiralty, Chief of the British Defence Staff and Chairman of the NATO Military Committee discusses the retaliatory credibility of the British strategic deterrent force in the following manner: "the Soviet Union must have a realistic fear and Britain must have a realistic assurance, that British weapons can penetrate the defences of the target and that British delivery vehicles cannot be eliminated by counter-measures. This must affect consideration of the type of system that Britain should seek to acquire." [Ref. 48: p. 25]

In his technical assessment of the situation, Ian Smart comments: "for a small deterrent, such as Britain has deployed, the survival criteria must be of unique importance." [Ref. 4: p. 50] Without the almost guaranteed ability to survive a pre-emptive first strike attack, the thin margin of credibility of a strategic national deterrent is quickly lost. Given these requirements and the relative strike capability of the Soviet Union, Smart argues that there are really only five potential launcher-delivery vehicle combinations which, in the British case, could be considered realistically survivable. Specifically they are cruise missiles mounted on mobile land-based platforms, in surface vessels, in submarines or in manned aircraft, and ballistic missiles in submarines. He singles out the ballistic missile in submarines as having the probable advantage because of its greater nuclear 'effect,' while the cruise missile options vary only in the degree of survivability they offer. [Ref. 4: p. 50]

Speaking of the importance of this quality in deterrent terms, Smart leaves no doubt as to which basing mode he considers the most secure: "so important is (survivability) that in the case of a deterrent force of very small size, with little if any margin of redundancy, there must be some real doubt about selecting a cruise missile based on land, in surface vessels or in manned aircraft - at least if it is to be the only kind of deterrent deployed." [Ref. 4: p. 50]

On this subject, Peter Nailor "highlights the relationship between the size of the armoury and the ability to stretch the minimum assessment of credible deterrence, which in the case of a medium power may depend more upon the relative survivability of the launch vehicle, than upon the proven ability of the system to penetrate effectively to its target. If this is the case, then it remains important for a medium nuclear power to have delivery systems that are, by general repute, up to date." [Ref. 30: p. 12]

The focal point of all these arguments is that for a medium nuclear power, such as Britain, to base its ultimate national security on the threat of strategic retaliation, its nuclear deterrent force must first, possess the ability to survive under the most adverse and hostile conditions of attack and secondly, be able to deliver its weapons in a reliable and effective manner. No land-based systems can any longer be considered totally secure. Nailor says "hardening is no longer capable of providing security for any fixed

land-based ballistic missile" and further, "it would be unwise for any nation now to rely exclusively on fixed assets for nuclear deterrence." [Ref. 4: p. 23]

Britain abandoned the concept of land-based ballistic missiles when it terminated the "technically-promising Blue Streak silo-based ballistic missile as... too vulnerable to surprise attack." [Ref. 1: pp. 10-11] The British Secretary of State for Defence Francis Pym judges that the situation remains the same today and that even mobile launchers do not make a marked change for Britain because she is "such a small territory within a very short flight time of Soviet land-based and sea-based missiles." [Ref. 1: p. 11] He goes on to lay out the Conservative Government's dictum on a land-based deterrent:

> No ground-launched force based in Britain could achieve the special standard of invulnerability to surprise attack appropriate for our ultimate strike capability. [Ref. 1: p. 11]

Pym's examination of alternative launch platforms revealed aircraft to be a viable option, but rejected it on several grounds including: vulnerability of aircraft and airfields; cost of maintaining a permanently airborne deterrent force and of the potential hazards associated with crowded airspace, over a small country; and the fact that choice of an aircraft as a launch platform would almost necessarily mean cruise vice ballistic missiles as the delivery vehicles because of the lack of technical expertise

available in the air-launched version of the latter category, and cruise missiles, mainly for reasons of penetrability, were not the government's first choice. [Ref. 1: pp. 11-12]

In the sea launch category, the Thatcher Government's position is that "surface ships compare poorly with submarines. They are not markedly cheaper for a given missile-carrying capacity, speed or endurance; and they are much easier for an enemy to find and track." [Ref. 1: p. 12] The conclusion that is drawn is that submarines are clearly the best platforms for Britain's future strategic force. The reasons are straight forward; they are what the British presently have with its attendent expertise and experience; and the West still enjoys a technological and operational advantage over the Soviets in ASW. In short, "the sea is vast and opaque" and likely to remain such in the foreseeable future, with the clear advantage lying with the submarine, especially with one which doesn't wish to be found, like an SSBN on operational strategic deterrent patrol. [Ref. 1: p. 12] In opting for submarines, Secretary Pym does not exclude smaller diesel-powered units in several different deployment schemes, but concludes that "it would be at best hazardous for Britain, which cannot afford several kinds of strategic force, to rely on pioneering so untried a concept." Additionally, "it is far from clear that these would cost less than nuclear submarines for a given degree of assurance of a given level of striking power." [Ref. 1: p. 13] Pym firmly states the

Government's decision simply: "for all these reasons, nuclear-propelled ocean-going submarines remain the best launch platforms for a British missile force." [Ref. 1: p. 13]

2. Ballistic Missile Options

If one accepts the argument that submarine-launched ballistic missiles are the crucial element of the most secure strategic deterrent force which the British could deploy, the question must still be asked, what is the best Polaris replacement missile for British purposes projected into the 21st Century. There is no clear-cut answer to this question, rather it will be an amalgam of the current flow and pressures of technology, politics, and economics. Interestingly, the decision, when it is made, may be less relevant to the strategic requirements perceived than to the political realities encountered as Lawrence Freedman indicates:

> While we may think responsible policy on the nuclear programme requires some attempt to anticipate the strategic environment of the twenty-first century, it is more likely that, as in the past, the relevant decisions will reflect current pressures and interests rather than speculation over the future. [Ref. 5: p. 1]

Ballistic missile replacement options which have been seriously considered in the case of the British strategic nuclear deterrent include the following: continued use of a refurbished Polaris A-3 with the Chevaline warhead modernization; upgrade to the MIRVed Poseidon C-4; development and production of a solely British-made ballistic missile; collaboration with the French on a joint ballistic missile

development project; or purchase, on hopefully favorable terms, of the new American long-range, submarine-launched Trident C-4 ballistic missile.

The idea of French-British nuclear collabcration never received much serious consideration because of the practical and political hurdles in the way of actual technical cooperation. The British nuclear deterrent force is so intimately connected to the American program "that any attempts to graft on a French missile would face problems of compatibility in related systems, as well as possibly contravening the regulations governing the supply of information from the United States to Britain." [Ref. 5: p. 64] The Americans, many of whom are not in favor of sharing with even Britain the secrets of nuclear and ballistic research and development, would certainly view with alarm, any British shift toward the French, who have been viewed with distrust ever since dropping out of formal military participation in the NATO Alliance in the 1960s.

The two countries nuclear programs are differently constructed and might even be considered complementary, with the French having a more advanced propellant and missile capability, while "Britain's indigenous nuclear submarine and warhead technology is ahead of that of France." [Ref. 5: p. 64] Secretary Pym states, however, that:

> another possibility, considered at an early stage, was a European solution. Collaboration in the European context would have been of considerable political

> significance. But it soon became apparent that this option had a number of disadvantages, in particular related to cost... the Government therefore sees no adequate basis on which such an option could now have been pursued. [Ref. 1: para 48]

The idea of an independently developed and produced British ballistic missile is certainly within the realm of technical feasibility, but as Neville Trotter points out "the cost would be very great as we should be starting almost from scratch on a very complex project." [Ref. 26: p. 122] In addition to the costly, technical problems a British ballistic missile would present in development terms, Britain does not possess any of the infrastructure necessary to support a major nuclear development and testing program, such as telemetric ranges, tracking stations and communications facilities.

If Britain chose, for its own reasons, to go it alone in developing a fully functional independent nuclear capability, at whatever cost, it would be surprising if this did not generate a reassessment of Britain's 'special relationship' with the United States in the area of nuclear cooperation, and would probably result in greatly loosened ties between the two countries, and added costs to an already expensive British undertaking. Peter Nailor underscores some of the important facets of this argument when he says "Britain has been able to save both time and money through her cooperative links with the United States... To maintain the American connection is to save the cost of re-creating a specialized

industry to produce particular types of rocket motors and ancillary equipment, and that of establishing testing ranges." [Ref. 30: p. 9] Nailor goes on to underscore an even more vital and fundamental theme on this subject when he comments:

> If for some reason the British government came to believe that nuclear weapons had assumed a new level of significance, sufficient to justify a separate national investment, it would be difficult to relinquish the American connection without implying that some fundamental reassessment of the British-American relationship had taken place. [Ref. 30: p. 9]

Conversely, a positive decision by the British to maintain the strongest and closest possible ties to the United States in the area of nuclear weaponry, reaffirms and reinvigorates that 'special relationship' which has existed between the two countries since the dawn of the nuclear age. Maintenance of a commonality in weapons systems also minimized the interface problems that exist in the joint targetting scheme presently established at SAC Headquarters in Omaha and insures a maximum integration of alliance deterrent functions at all levels of command.

While continued close US - UK cooperation has guaranteed British access to state-of-the-art nuclear weapons technology, it has done so at the expense of the infrastucture which originally made Great Britain a nuclear power. James Bellini and Geoffrey Pattie emphasize this point in their comments on the Polaris Purchase Agreement which resulted from the 1962 Nassau Conference between U.S. President Kennedy and British Prime Minister Macmillan:

> The Polaris arrangement insured for Britain the continuation of a British nuclear capability. But it guaranteed at the same time that a large measure of control over its use would pass into American hands, not least because taking the U.S.-built Polaris system made it inevitable that Britain would not maintain the research capacity to produce a viable successor. [Ref. 49: p. 21B)

Bellini and Pattie go on to say that today Britain "is at best a proxy nuclear power of minor status without an adequate technological ability for a new generation of nuclear weapons" and that "Nassau encouraged a certain habit of mind: essentially, that deterrence was cheap." [Ref. 49: p. 218]

The point that Bellini and Pattie argue is that although the 'special relationship' with the United States has guaranteed Britain advanced nuclear technology and systems, it is a false capability that unsupported would wither away.

They point out the impact that US - UK cooperative weapons agreements have had on the British Polaris replacement question:

> The nature of the Nassau Agreement was such that Britain abandoned a large degree of independence in the production of strategic missiles. The loss of missile technology contrasts starkly with French experience over the 1960s as France built up its own deterrent. It leaves France today far better placed to develop, for example, a credible cruise missile system. [Ref. 49: p. 218]

While there is more than an element of truth in the statements of Bellini and Pattie, they are also slightly overstated conservative reactions to what, for the British, have become the political and economic realities of the situation. The Polaris Improvement Program, codename Chevaline, revealed the extend to which the British were concerned with the

maintenance of their technical proficiency in the nuclear area. As Lawrence Freedman explains:

> The virtues of Chevaline did not lie in its strategic rationale but in the fact that it appeared to be the minimum required to keep Polaris up-to-date... the aim was to keep a nuclear capability in being. This involved more than maintaining the quality of the Polaris fleet. It was also necessary to maintain an adequate design capability for new weapons. [Ref. 5: p. 53]

Freedman goes on to point out that without a major focus such as Chevaline, which was both a guidance system and warhead modernization, the talents and morale of a specially qualified design team would lapse over time and this expertise and experience would be lost and virtually impossible to reassemble for new and demanding projects.

It is clear that Britain has been concerned with maintaining a solid technological base in nuclear research and development and has shown an excellent capacity to do so in the areas of guidance and warhead design, as evidenced by the success of the Chevaline project. While British reliance on American delivery systems has left a substantive gap in its own technological capabilities, this factor has been very much dictated by the economic realities of British politics. Freedman says "the nuclear force has kept its place in the defence budget over the years because it has not been especially burdensome... the nuclear strategic force does not appear exorbitant, considering the relative punch it packs." [Ref. 5: p. 79] The French have claimed a nuclear triad

capability since the early 1970s, but it has taken 20-25% of their defense budget to build and maintain it. This compares to the British primary deterrent capability, its Polaris SSBN force, whose costs have averaged about 2 1/2% of the British defense budget and which is at least as credible as the French deterrent force.

In announcing the choice of Trident as the preferred alternative for replacing Polaris, Francis Pym covers the subject of British ballistic missiles as follows:

> It would not be impossible for British industry to develop and build ballistic missiles for strategic use. We have however had no major capability in this field since the 1960s, and to re-acquire it would be very expensive, take a long time and involve much uncertainty. This cannot be an attractive option. [Ref. 1: para 44]

It should be noted that the 'uncertainties' which underlie any developmental undertaking of this magnitude are both very real and very expensive. Chevaline costs grew from an estimate 250 million pounds to around 1000 million pounds because of problems associated with the front-end guidance mechanism. [Ref. 5: pp. 52-55] For a country such as Britain, with a particularly thin margin of deterrent credibility, based on a single strategic weapons system, the uncertainty of this research and development process could easily spell the end of that deterrent's effectiveness.

Having rejected for reasons of economy and politics, the development and production of a British ballistic missile, either alone or in concert with another European nation, "it was not," as Lawrence Freedman says:

> inevitable that Trident would be the preferred system. As the need for a new force was caused by the decline of the submarines rather than the missiles, in principle the existing Polaris A-3 missile, or some modified version, could have been kept going, buying up the American stocks when they took Polaris out of service. [Ref. 5: p. 76]

Freedman makes a crucial point in this debate over the replacement question when he says "for British needs Polaris should remain quite adequate for some time, and the country has recently spent considerable sums devising and producing a new warhead." He goes on to say "the difficulty lies in holding on to a 1960s technology well into the next century. Maintenance, spare parts and, most of all, compatibility with the technological environment in which one is operating would make life increasingly difficult and expensive." [Ref. 5: p. 76]

Speaking on this subject, Secretary Pym states that "the present Polaris missiles could be kept and fitted into new submarines. They would need new motors, produced from restarted production lines." He continues that "removing equipment from the present boats and fitting it into the new ones might not be cheap or easy, and would entail major problems in maintaining continuous operational capability during the transition." [Ref. 1: para 45] The conclusion that Pym presents is that "a force based on the existing missiles in new submarines would not be cheap and perhaps not highly reliable. Nevertheless, it would be cheaper initially than an entire new force in capital cost." [Ref. 1:

para 46] "The difficulty" that Secretary Pym sees with this approach "is that the resulting force would be of uncertain value and short life. For operational reasons a force based on Polaris - even with Chevaline... would be able to maintain a high deterrent assurance in the later 1990s, let alone beyond that, only if advances in Soviet ability to counter it proved unexpectedly modest." [Ref. 1: para 46] He implies that such an approach would be "seriously irresponsible" on the part of the British government. [Ref. 1: para 46]

The Conservative Government of Mrs. Thatcher also considered various methods of upgrading the basic Polaris missile, "mainly by the use of more modern and powerful rocket fuels to give more range and payload as an insurance against improved Soviet capabilities." [Ref. 1: para 47] This option was rejected, however, because the research, development and procurement costs would have fallen entirely on Britain and the resulting "missile system costs could well be twice those of Trident, for a smaller and less assured capability." [Ref. 1: para 47]

The Poseidon missile was also rejected as a delivery vehicle for any new deterrent force for reasons of cost effectiveness. The Poseidon was developed for the United States Navy as a replacement for the A-1 and A-2 versions of the Polaris missile. It was designed to ensure penetration of the Soviet Galosh BMD around Moscow by means of multiple independently-targetted re-entry vehicles (MIRV).

The Royal Navy had knowledge of the Poseidon missile project as early as 1966 and seriously considered the possibility of converting the British deterrent force to the Poseidon SLBM as early as 1972. The basis of their preference was for "keeping up with Americans in the line of its force development, rather than staying with a missile which had been superceded by a newer and better model, and a belief that the cost would not be exhorbitant." [Ref. 5: p. 45] The procurement of the Poseidon missile at this time was rejected because of both technical and political considerations that adjudged the benefits to be gained greatly outweighed by the projected costs in monetary and political capital.

Lawrence Freedman indicates the Posdidon's technical problems centered around its warheads. He says that "apart from the ability to carry a much more sophisticated warhead, and some benefits in range, Poseidon had few advantages over Polaris that were worth the expenditure of a few million pounds per copy." [Ref. 5: p. 39] The problem was that the warhead on the Poseidon was MIRVed and Britain would have to produce her own because this indigenous industrial capability was one which she had decided was critical to maintain and also because it was unlikely the United States would provide it. As Freedman points out:

> It was not that Britain could not have made a MIRVed warhead. The research teams at Aldermaston understood the technology. In fact, Britain had helped the American programme by advising on areas of this technology where it had the lead. But there was no

need for high missile accuracy. The only interest was in the penetration of ABMs, for which a more sophisticated version of the existing warhead could well be sufficient. [Ref. 5: p. 39]

A British request for Poseidon would have required a more public and therefore visible political decision which would have attracted more attention than other alternatives which were available. Even though "the Americans felt the British lacked ambition in rejecting Poseidon, staying with an intermediate technology and so losing the full benefits of MIRVs," [Ref. 5: p. 49] Freedman implies that American political difficulties contributed as well. In commenting on this question, he says the American Secretary of State, Henry Kissinger, suggests "the problem...was more that Congress was in an awkward mood on this sort of issue and was likely to refuse to countenance the transfer of this particularly advanced piece of American technology." [Ref. 5: p. 46] The British, in deploying the Polaris SLBM, had reached a point where "the nuclear program was no longer a major political issue. There was a quiet and essentially bi-partisan consensus on maintaining the force and not moving to Poseidon." [Ref. 5: p. 50] Freedman notes that "a move to Poseidon would have been politically controversial," and that as the Labour Party was publically opposed, "it would have been difficult...to avoid a commitment to scrap it if and when it (Labour) returned to office." He concludes that "if Poseidon was adopted and then cancelled, the liklihood was that the deterrent would be

abandoned altogether, or at least allowed to die slowly." [Ref. 5: pp. 50-51]

The alternative the British chose to follow in place of Poseidon was the Super-Antelope project which eventually became the 1000 million pound Chevaline Polaris Improvement Program. Although the cost of the proposed Poseidon puchase rose over time, the growth of the selected Chevaline program was even more dramatic. Freedman comments:

> a programme that involves a large amount of new development work and is only to be produced in a limited number of units is extremely vulnerable to cost-escalation. This, in fact was what happened - to the extent that it is arguable that it would have been less expensive to opt for Poseidon. [Ref. 5: p. 49]

In spite of the fact that Poseidon had previously been rejected in the 1970s, arguments were considered for adopting it as the eventual successor to the Polaris SLBM. Secretary Pym says that "Poseidon would be an effective system, but particularly because of its shorter range it would offer less long-term insurance than Trident against improved Soviet capabilities." [Ref. 1: para 50] It is worth noting that if Poseidon were selected as the Polaris replacement system, it would be coming into service in the Royal Navy about 1990, just as or after it had been phased out of active service in the U.S. Navy, in favor of one of the Trident versions. These circumstances are similar to those which were dominant in forcing the issue of Polaris replacement itself. Pym comments:

> the initial purchase price would be lower, but several factors offset this. The age of the missiles and related equipment would mean higher maintenance costs, and almost certainly a major re-motoring programme before long. We would have to bear all the continuing support costs for a system no longer in United States service. We should also have to undertake a very extensive British warhead development and testing programme and perhaps further work to adapt the missile system to our warheads. [Ref. 1: para 50]

In speaking of and rejecting the Poseidon as a viable replacement alternative, Secretary Pym concludes "in all, it is unlikely that the cost would be lower (than Trident), and the system would be less good." [Ref. 1: para 50]

It is noteworthy that, in rejecting the Poseidon, the Secretary of State for Defence did not address its MIRV capability, which had previously been considered a deterrent liability by the British. This fact is important because it leads to an examination of the change in British targetting doctrine which will apparently result from the decision to replace Polaris with Trident.

3. Targetting Considerations

The British strategic ballistic missile submarine force is designed to deter the Soviet use of nuclear weapons against the NATO alliance, Britain herself and those assets considered vital to the protection of British national sovereignty. By inspiring a realistic fear in the Soviet Union of unacceptable social and political devastation inevitably resulting from an assured British nuclear retaliatory response to a Soviet nuclear attack, the likelihood of

such an attack is significantly reduced. The value of the deterrent is measured solely in its ability to prevent such an attack. The technical "credibility" of the deterrent is measured in terms of its effectiveness, reliability, penetrability and survivability; traits which have already been discussed. How well the British deterrent force can carry out this mission depends to the degree which the Soviets perceive it as being capable of sufficiently threatening those supreme values which are of critical importance to their regime's continued existence.

Since the adoption of the submarine-launched ballistic missile as the primary delivery vehicle for its strategic deterrent force, British targetting doctrine has been based on a counter-value rather than a counter-force concept. Briefly, this means that the British, in joint targetting coordination with the United States at Omaha, have chosen to threaten targets of chiefly political and social significance to the Soviets, while generally disregarding the Soviet strategic forces. The reasons are two-fold and relate to the size and technical quality of the British deterrent.

The British four-boat SSBN squadron, armed with sixteen Polaris A-3 missiles each, could threaten no more than 64 separate Soviet targets when fully deployed. This constitutes only a fraction of the total strategic strike capability which the Soviet Union is able to field. In any

realistic nuclear scenario, it is unlikely that the British would be able to get all their SSBNs to sea in a timely fashion. The baseline credibility of the British deterrent is therefore the maximum number of targets which can be reliably threatened by the single British ballistic missile submarine currently maintained as the minimum on constant operational patrol. Given the normal factors of attrition and reliability ascribed to the Polaris missile, it is generally accepted that the British deterrent force can successfully threaten a minimum of twelve separate Soviet targets.

This capacity clearly does not constitute a serious threat to the strategic strike capabilities of the Soviet Union as the Soviets would be left with well over 95% of their delivery vehicles untouched even under circumstances most favorable to the British. Although Britain would probably be acting in concert with the United States and the other nations of the Atlantic Alliance in the event of a Soviet attack, the validity of her deterrent capability vis-a-vis the Soviet Union must be based on 'last resort' circumstances in which she were acting alone. Given these criteria, it is obvious that Britain could not hope to attack the Soviet Union's strategic forces, but must rather seek to influence the minds of their leaders by promising retaliation aimed at Soviet cities, industry and population; its societal structure and values, rather than its military forces - thus a counter-value strategy.

As the size of the Britain nuclear arsenal dictates a countervalue strategy, so does the type of equipment currently deployed. The Polaris missile, in all versions, never had the combination of accuracy and destructive power necessary to be an effective counterforce weapon and it was never touted as such. The British Chevaline program was designed to maintain the ability of the delivery vehicle to penetrate to its target in the face of potentially more effective ballistic missile defenses and did nothing to up-grade its ability to attack 'hard' targets. The Chevaline modernization was required to maintain the 'Moscow criteria,' the ability to successfully attack the seat of Soviet power and government in any retaliatory strike, a subject which has been previously considered. The fact that Britain's deterrent force is sea-based inherently complicates its guidance problems and further adds to the cumulative errors that are the final determinants of accuracy.

Writing in 1977, Ian Smart comments on the accuracy required for a counterforce strategy in this manner: "a very great deal depends on the accuracy with which a nuclear weapon can be delivered on its target... it also demonstrates that, with any accuracy currently available, 'hard' military targets in the Soviet Union are very unattractive to a small deterrent force." Smart goes on to say that "given a plausible accuracy of 0.3 nautical miles CEP (circular error probable), a single Polaris A3 warhead (200KT) has, in fact, only a 34%

chance of destroying a 300 psi missile silo - of which the Soviet Union has some 1500." [Ref. 4: p. 41] This counter-force estimate was provided by Smart before the deployment of Chevaline which is no more accurate than the Polaris A3 and, in fact, may be less so because of its corkscrew manuever. It reportedly also carries smaller warheads than the A3 and is thus even less capable of attacking the main targets of the Soviet strategic strike force. Speaking of the future, Smart concludes:

> new guidance systems may make it possible for cruise (or ballistic) missiles to be fired with much more accuracy... even then, however, the number of weapons which Britain would be likely to deploy would hardly be large enough to merit their commitment to attacks on individual 'hard' targets in the Soviet Union. [Ref. 4: p. 41]

Nonetheless, the ability of the British ballistic missile submarine force to inflict damage on the Soviet societal structure is considerable, primarily because the explosive power of thermonuclear weapons is tremendous and totally out of proportion to the number which one deploys. The British SSBNs currently maintained on operational patrol are credited with the ability to deliver some 23-33 EMT (equivalent megatons) in a retaliatory second-strike on the Soviet Union. (EMT is a descriptive term developed by strategic analysts to scale the effectiveness of various nuclear weapons for comparative purposes. 1 EMT expresses the damage effectiveness caused by a 1 MT weapon). [Ref. 4: p. 35] While the total British EMT is relatively small when

compared to the U.S. and Soviet arsenals, it still represents a tremendous destructive capacity equivalent to 150-250 times that directed towards Hiroshima and Nagasaki together in 1945. [Ref. 4: p. 36]

Ian Smart emphasizes the fact that "it represents a threat to a substantial part of the Soviet population and industry." [Ref. 4: p. 38] He goes on to say:

> Using the basis of calculation developed in the US Defense Department under Mr. McNamara, it can be estimated that the delivery of 33 MTE on Soviet urban areas might kill 6-8% of the Soviet population... and at the same time destroy up to 25% of Soviet industrial capacity. Whatever else that may be, it is not apparently trivial. [Ref. 4: p. 38]

It has always been difficult to ascertain from the British Government specific information on sensitive defense subjects like strategic nuclear targetting priorities. General assumptions, however, can usually be developed that approximate the governmental position or policy. In the case of the British Polaris force, it is generally assumed that it will be used to threaten the maximum number of Soviet urban complexes, thus inflicting maximum losses on the Soviet population and disruption on its industrial complexes and societal structures. But as Robin Ranger points out:

> How many Soviet cities and people the British force could, or should, kill is not usually discussed, certainly not with the precision of U.S. debates on U.S.-Soviet nuclear capabilities. This avoids discussion of the sensitive issues of which targets the U.K. wants to hit, when, and with what nuclear forces--strategic, theatre or battlefield. [Ref. 7: p. 7]

Ian Smart goes beyond the ambiguity usually associated with British targetting strategies when he says: "the interesting point is that even a relatively small British force could, in fact, launch a highly effective attack on not only 'soft' civilian targets (as is often assumed) but also on 'soft' military and 'semi-hard' military and civilian targets. That range of choices includes such very sensitive targets as ABM or air defence early warning and control radars, hydro-electric or thermal generating stations, heavy industrial complexes, military airfields and naval ports." [Ref. 4: pp. 41-42] In discussing targetting priorities, Smart considers possible changes in future British deterrent forces:

> One implication of this is strategic: that a new British deterrent force might usefully include amongst its potential targets a range of critical military and civilian assets going well beyond civilian population alone. Another implication is technical: that, if Britain is to procure a new deterrent missile system, there is much to be said for investing in the accuracy with which its missiles can be delivered, in order to pose a more credible threat to 'semi-hard' as well as 'soft' targets. [Ref. 4: p. 42]

The British Secretary of State for Defence, Francis Pym, addressed this same subject in his statement announcing "The Future United Kingdom Strategic Nuclear Deterrent." Pym said "one practical approach to judging how much deterrent power Britain needs is to consider what type and scale of damage Soviet leaders might think likely to leave them critically handicapped afterwards in continuing confrontation

with a relatively unscathed United States." [Ref. 1: para 10] He goes on to discuss the uniquely different point of view of Soviet leadership: "the Soviet Union is a very large and powerful state, which has in the past demonstrated great national resilience and resolve. Its history, outlook, political doctrines and planning all suggest that its view of how much destruction would constitute intolerable disaster might differ widely from that of most NATO countries." [Ref. 1: para 11] Speaking of the Trident decision and targetting priorities, Pym concludes:

> Successive United Kingdom Governments have always declined to make public their nuclear targetting policy and plans, or to define precisely what minimum level of destructive capability they judged necessary for deterrence. The Government however thinks it is right now to make clear that their concept of deterrence is concerned essentially with posing a potential threat to key aspects of Soviet state power. There might with changing conditions be more than one way of doing this, and some flexibility in contingency planning is appropriate. It would not be helpful to deterrence to define particular options further. [Ref. 1: para 12]

Ian Bellany's comments on British nuclear doctrine are particularly relevant at this juncture. He points out that:

> strategic doctrine is a living thing, the product of a kind of dialogue between what the planners would ideally like and what weapon manufacturers trying to meet planners' requirements are able to come up with. Since we do not in this country (Britain) have a strategic delivery vehicle (ballistic or cruise) manufacturing capability we do not have a strategic nuclear doctrine in the true sense either. Rather, when we purchased Polaris A3 we purchased at the same time a definition of what our strategic nuclear

> force was for - a counter-city force, since it was too inaccurate to be anything else, and a force of retaliation since it was too inaccurate but also too small credibly to be otherwise. [Ref. 29: p. 13]

Addressing himself to the Trident C4 ballistic missile which the Conservative Government of Margaret Thatcher has chosen as a replacement for Polaris, Bellany continues "accurate MIRV front-ends have multiplied warhead-to-target ratios to such a degree that even a five boat Trident C4 force could be assigned a mixture of military and civilian targets. In purchasing C4 we should be purchasing not a ready made role but for the first time in a long time the necessity of choice as to role (similar considerations, clouded somewhat by certain unknowns as to performance, also apply to the cruise missile)." [Ref. 29: p. 14] Bellany speaks of the implications of this fact when he says:

> If we are successful in obtaining C4... or even one of the several varieties of cruise missiles under development by the United States, we shall be faced with the novel and possibly unwelcome problem of deciding precisely how we are going to use it. Polaris A3 can only be used to hit cities. C4 has the accuracy, and in a five boat fleet perhaps the warheads too, to enable us to be more selective in nuclear targetting than we have ever known how. [Ref. 4: p. 15]

The discussion of possible new British targetting options focuses primarily on the alternatives presented by a replacement force deploying the Trident I (C4) missile, a three-stage solid propellant, inertially guided, submarine-launched ballistic missile, designed to carry up to eight independently-targettable warheads to a maximum range of

about 4000 to 6000 nautical miles, depending on the payload. [Ref. 1: p. 28] William Siuru, in the Air University Review, describes the Trident as follows:

> The Trident I missile is designed to fit the same missile tubes as the Poseidon but achieve almost twice its range... in order to get more than 4000 miles range... the Navy has done many things. First, a third class stage has been added. Second, more energetic and denser propellants are packed into all stages to provide more efficient use of the propellant load. Finally, many of the missile components have been made lighter so that weight saving can be applied to increasing range. [Ref. 50: p. 28]

Trident I uses more compact and lighter microelectric circuits; graphite epoxy materials in the place of aluminum; a nose made of Sitka spruce wood; and has an aerospike which pops out of the nosecap during flight and at supersonic speeds forms a shock wave that drastically reduces the drag on the blunt, ogive-shaped missile. [Ref. 50: p. 28]

Lawrence Freedman declares that a major advantage in buying Trident I is that it is both modern and proven: "Trident has been designed with American rather than British needs in mind. This is most evident in its range of 4000 nm. Polaris' 2500 nautical miles gives Britain adequate target coverage." [Ref. 5: p. 77] Freedman finds "the most significant change in moving from Polaris to Trident lies in the warhead. The British will produce their own warhead. It may well be tempted to follow the American design... which would result in a MIRV front-end... a major leap in sophistication... something less complicated and capable

would do.. but here again the cost of not following the American line of development may result in lower quality for greater price." [Ref. 5: p. 77] This is in obvious reference to the British decision to build Chevaline rather than buy Poseidon in the 1970s.

Arguments have been advanced that the decision on the missile is inconsequential because "the main cost of the system will lie with the submarines rather than the missiles." [Ref. 5: p. 76] Others argue that, although submarines are the best basing mode for a strategic deterrent force, other more attractive alternative launch platforms exist besides the present and the proposed 16-missile SSBN. Chief among these is the Shallow Undersea Mobile (SUM) as conceived by Drs. Garwin and Drell and advocated by Farouq Hussain. He says the "deployment of many small submarines armed with a small number of missiles permits a much more flexible and controlled response than would be available from larger submarines armed with many missiles whose vulnerability to detection or destruction increases significantly following the launching of one missile." [Ref. 27: p. 10]

Freedman agrees that "the waters around Britain are not congenial for Soviet anti-submarine activities, while the range of the Trident is such that there is no need to stray far from home." [Ref. 5: p. 78] He sees little enthusiasm for this solution, however, "because of the reluctance of naval architects to resist an opportunity to

produce the most advanced submarine possible... it may reflect the phenomenon we have already noticed: the reluctance to experiment in a program with only slight margins for error." [Ref. 5: p. 78]

The main objection to a new submarine-launched ballistic missile seems to be the total cost of the system, which includes missiles, spares, support facilities and the submarines themselves. Ian Smart puts the question in perspective when he says:

> if Britain is to deploy only one kind of weapon as a strategic nuclear deterrent for the 1990s - which seems overwhelmingly plausible - the rationale choice is likely to be between a new force of submarine-launched ballistic missiles and a force of submarine-launched cruise missiles. In terms of individual delivery vehicles, the former option, taking reliability, penetration and effect into account, has a clear advantage... that disadvantage can be off-set, in each case, by deploying a larger number of cruise missiles. The question, therefore becomes one of cost... which, in fact, would cost less to develop, produce and operate? [Ref. 4: p. 50]

The most commonly quoted price tag for a Trident I equipped force of five new British SSBNs is between 5500 and 6500 million pounds spread over a ten - fifteen year period. [Ref. 29: p. 131] This subject will be more fully explored in the section dealing with the domestic implications of the British replacement decision.

Ballistic missiles are the front-running candidates in the Polaris replacement sweepstakes; which one and for what reasons are still matters under consideration. They are the most survivable alternative when linked to a submarine

as a launch platform. They have excellent traits of reliability, penetrability, and effectiveness and are particularly well-suited to a nation with a small deterrent force like Great Britain; which cannot afford to invest in a diverse and varied number of nuclear capable strategic systems. Whether the apparent choice of Trident I missile by the Thatcher Government remains the best choice remains to be seen. Before the announcement of the decision Jonathan Alford commented that "it is becoming clear that the British Government is very interested in acquiring the Trident C4 missile from the United States. Such a missile would clearly increase Britain's capability substantially even if only deployed in the same numbers as Polaris A3." He goes on to say "it is doubtful whether Britain needs to be able to deploy more warheads of substantially increased accuracy on missiles with close to twice the range... the Polaris A3 will remain an adequate missile even if new platforms have to be built to carry it... aging of this missile will remain a matter for concern, but there do not as yet appear to be any absolute barriers to prevent Britain from taking the necessary steps to assure the reliability of the system into the next century." [Ref. 30: p. 36]

Lawrence Freedman underscores the political strength of submarine-based ballistic missiles when he comments:

> The incentive to follow the previous system in all respects is strong. It reduces problems of basing, training, and general infrastructure costs. It is

> safer, if less exciting and bold, to follow familiar technologies and concepts rather than experiment with a bright idea that could go terribly wrong. If this programme fails it is unlikely that there will be the political will or available money for another try. [Ref. 5: p. 78]

SLBMs remain very much the first choice for a British strategic nuclear deterrent force. It has become, however, a matter of balancing the alternatives available to achieve the political and strategic consensus that can be sustained in the face of the serious economic and political realities facing the British nation and its defence strategists.

IV. THE TRIDENT DECISION

The decision of the Conservative Government to purchase the Trident I (C4) submarine-launched ballistic missile from the United States as a replacement for the Polaris A3 SLBM in the 1990s was announced by the British Secretary of State for Defence, Francis Pym, on 15 July 1980. Released along with Pym's statement were the text of letters exchanged between British Prime Minister Margaret Thatcher and American President Jimmy Carter and their respective Defense Ministers detailing some of the specifics of the transfer.

In her request the British Prime Minister states that "the Government has concluded that the Trident I weapon system best meets the need to maintain a viable nuclear deterrent capability into the 21st century." [Ref. 1: ltrs] The request becomes more specific as follows:

> The United Kingdom Government would wish to purchase sufficient missiles, complete with multiple independently targettable re-entry vehicles and less only the warheads themselves, together with equipment and supporting services, on a continuing basis and maintain a force of 4 British submarines (or 5 if the United Kingdom Government so prefer)... the successor to the Polaris force will be assigned to the North Atlantic Treaty Organization, like the Polaris force; and except where the United Kingdom Government may decide that supreme national interests are at stake, the successor force will be used for the purposes of international defence of the Western alliance in all circumstances... the objective of the United Kingdom Government is to take advantage of the economies made possible by the cooperation of the United States in making the Trident I missile system available in order to reinforce its efforts to upgrade its conventional forces. [Ref. 1: ltrs]

The Economist trumpetted the announcement with headlines that said "It's Trident, it's American, and it's a Bargain." [Ref. 51: p. 26] The article noted that there were two surprises in the British decision, the first that "the number of submarines to be constructed is not five, as had been forecast, but only four - with an option to order a fifth within two or three years." [Ref. 51: p. 26] This seemed to indicate a lively debate within the ministry itself, because five is more cost-effective and provides a greater degree of flexibility in maintaining a 'credible' strategic deterrent. The second surprise was the missile's dominantly American warhead. It had been believed that the British would buy only the missile and would build the entire warhead itself. As the Economist article points out, however, "Britain... will buy the entire Trident rocket, guidance system, nose cone, dispenser and all - from the United States. Only the nuclear re-entry vehicles - the actual bombs - will be made in Britain." [Ref. 51: p. 26]

The total procurement cost of the program will be between 4500-5000 million pounds for a four boat force and up to 6000 million pounds if a fifth boat is added. Of this about 30% will be spent in the United States for the missiles and their associated MIRV systems. [Ref. 52: p. 1] The DMS Newsletter reports that the submarines will be designed so that they can be retrofitted with the larger Trident 2 missile if the UK subsequently decides its adoption is necessary. [Ref.

52: p. 1] Secretary Pym discusses the Trident II as a larger SLBM that would give still greater range and payload, but at a higher cost. He indicates, however, that "the US Government... is not expected to decide for another two or three years whether to proceed with Trident II. Our own choice could not be made dependent on uncertain possibilities like this." [Ref. 1: para 53] The proven, flight-tested capability of Trident I, gave it a particularly strong advantage over competing vehicles (cruise or other ballistic alternatives) in the case of Britain's small national strategic forces whose 'credibility' is the sole measure of their deterrent effectiveness.

The financial arrangements between the United States and Britain for the Trident purchase follow the general pattern of the Polaris Sales Agreement of 1962 and levy a flat 5% surcharge on the British as their portion of the research and development costs incurred. Additionally, the British agreed to assume manning requirements of the Rapier air defense positions at USAF bases in the United Kingdom. [Ref. 1: ltrs] Other less publicized costs are also assumed to have been exacted by each side and probably include the continued use of Holy Loch, Diego Garcia and other 'joint' installations; continued technical and material exchanges in areas of mutual interest; and the stationing of 160 GLCMs in the United Kingdom as part of NATOs intermediate-range nuclear force (INF) modernization.

The reasons for the British Government's decision to continue their strategic nuclear capability into the 21st Century have been previously enumerated in some detail. Briefly, the international landscape is seen as still as unsettled and troubled as at any time since the advent of atomic weapons. The United States' nuclear predominance has gradually given way to equivalence with the Soviet Union. There is no doubt expressed about the validity of the U.S. nuclear guarantee to protect Western Europe, but just in case, there is everything to be gained and nothing to be lost by Britain's keeping her strategic nuclear deterrent force intact and credible, to have the capacity to influence uniquely perilous situations where British national values or interests are at issue. Without a compelling reason to give up this significant capability which has been maintained without fail, for over a quarter of a century, there is little likelihood that it will be given up, unless the economics become totally unmanageable.

Having chosen to maintain their nuclear capability, the British are inclined to submarine-launched weapons because of their extensive experience with them and because of the superior survivability factors associated with this particular type of launch platform. In the judgement of the Thatcher Government, the other potential launch platforms all suffer varying higher degrees of vulnerability. This is unacceptable to a medium nuclear power such as Great Britain where the

inviolability of its strategic retaliatory force is often the principal determinant of its deterrent effectiveness. While the cost of any submarine-based system is considerably more than that of other alternatives, this is accepted as a necessary price to pay to preserve the integrity of the deterrent threat posed.

Ballistic missiles were considered the best choice for the British deterrent because of their reliability, penetrability and effectiveness. Cruise missiles were viewed as an interesting and potentially quite promising development, but one which was still unproven and upon which it would be of questionable wisdom to base the ultimate guarantee of the vital interests and national sovereignty of Britain. The prime attribute which cruise missiles offered was their relative cheapness vis-a-vis ballistic missiles. Even this supposed advantage, however, was of questionable value when survivable launch platforms and the large numbers of cruise missiles needed to achieve the same effect as ballistic missiles were factored into the equation.

Several ballistic choices were available for the British to follow in replacing Polaris, but after evaluating the cost and cost-effectiveness of the various alternatives over the projected life of the deterrent force, the Conservative Government chose to purchase the Trident I system from the United States. Secretary of State for Defense Francis Pym describes the choice in the following manner:

> the MIRV capability and long range give excellent margins of long term insurance against further advances in Soviet ABM and ASW capability; and improved techniques give better accuracy than earlier systems offered. The Trident system is likely to remain in United States service for many years to come, during which all the economies of commonality will be available to us. [Ref. 1: para 51]

Writing in the Guardian following the announcement of the Government decision to proceed with the Trident purchase, Lawrence Freedman says the "two criteria - of survivability and penetrability - have governed the choice of the Polaris replacement." He discusses the other principal alternative in these words: "the cheapest and simplest option for a successor would have been ground-launched cruise missiles... they failed the test of both survivability... and penetrability." [Ref. 53: p. 11] He goes on to indicate that the British Government chose the safest option available; although five submarines would have been the preferred choice, the slumping British economy dictated that four would have to do, at least initially.

Freedman points out that it has been "suggested that going for the MIRVed, long-range Trident with its eight individual warheads is far in excess of British needs and that something simpler would have been sufficient. Technically this is true but it is by no means the case that a simpler system would have been less expensive. This is because Britain is now inextricably linked to the pattern of United States missile development. The virtues of Trident were not

so much its capabilities as the fact that it was the most modern and proven American system available. By taking it, Britain avoids expensive development costs and makes some savings through shared support costs. This financial benefit could not have been achieved with most other options, even adopting older American missiles or putting the Chevaline front-end on Trident missiles." [Ref. 53: p. 11]

Following the Trident decision, the Sunday Times headlined another analysis by Lawrence Freedman wondering "Trident: will it still work in 2020 A.D.?" Freedman's contention is that one of the most powerful arguments behind the decision is the influence of the past; "more specifically, the experience with the Polaris missile, which has clearly reassured the defence establishment." [Ref. 54: p. 17] Freedman discusses the Trident decision in this manner:

> What Tuesday's decision reveals first... is a preference for continuity. There is to be no experimentation with novel systems, such as hover-craft-based Cruise missiles, nor any attempts at innovation in strategic doctrine. [Ref. 54: p. 17]

Freedman goes on to comment that "this continuity in system reflects more the success of the Polaris programme than a judgement on Britain's strategic and political environment." [Ref. 54: p. 17]

Freedman outlines clearly a number of basic assumptions made by the military and political strategists in arriving at the Trident decision. These include the assumption that the strategic environment will change in detail and in degree

but not in fundamentals; that there will be no major breakthroughs in the techniques of anti-submarine warfare; and that the 1972 Anti-Ballistic Missile Treaty will continue to be effective. [Ref. 54: p. 17] In fact, the only major change which Freedman sees the Trident decision anticipating is the development of substantial Soviet defenses to Cruise missiles. He says that "the Ministry of Defence argues that defences designed to cope with American Cruise missiles would cause immense problems for any British Cruise missile force which would have been smaller." [Ref. 54: p. 17] Freedman does, however, underscore the fact that "if the expected Soviet air defences do not in fact materialize, Britain's rejection of the Cruise option will, of course, look less convincing." [Ref. 54: p. 17]

Robin Ranger's analysis of the British Government's decision-making process regarding the Trident purchase is somewhat more pointed and cynical than those of most defense observers. He says "Mr. Pym's view appears to be that the Russians are bad chaps, so defence is a good thing and, since Trident is a good system, Trident is a good thing." [Ref. 7: p. 5] The fact that should not be discounted is that after all the nuances of strategic doctrine have been examined, this simplistic 'gut' rationale may not be too far removed from the mark.

David Fairhall depicts the Trident decision in much the same vein as Freedman when he says "the essential characteristic

of the Trident deterrent system... as a replacement for Polaris is that it resembles its predecessor in almost everything but the scale of destruction it can guarantee to bring down upon Soviet cities." [Ref. 55: p. 4] It is interesting to note that the increased destructiveness of the MIRVed Trident over the other strategic alternatives considered has not received a great deal of emphasis in public arguments and analysis. From a strategic perspective, the capacity to inflict a significantly higher level of retaliatory punishment is a major gain in terms of the political will and determination necessary to establish the credibility of a second-strike deterrent. Trident provides this ability and more in full measure.

According to Fairhall, "Ministry of Defence officials regard the... package as highly satisfactory. But the Trident programme's immense expense relative to the remote contingency for which it is designed, is nevertheless the most controversial aspect." [Ref. 55: p. 4] The announcement indicated that the capital cost of Trident "is unlikely to absorb more than 3 per cent of the total budget between 1980 and 1995" and "that such sums could be found within the defence budget without cutting into other weapons programmes and our contribution to NATO's conventional defences." [Ref. 55: p. 4] Fairhall views these claims with skepticism and cites the fact that on the day before Pym's Trident statement, the British announced their decision to proceed

with the acquisition of Challenger tanks for the army rather than develop a completely new and more costly MBT design for the late 1980s. Funding, as well as tactical considerations, was a determining factor.

The problems associated with Polaris replacement and the maintenance of strategic British nuclear deterrence into the 21st Century have confronted British political and strategic planners for over a decade. The resulting decision on Trident is thus a strong affirmation that a political consensus has existed through several British governments of varying persuasion about the importance of maintaining a British nuclear retaliatory capability. When the Labour Party of Harold Wilson came to power in 1974, it was faced with the decision whether to proceed with the Chevaline development. Lawrence Freedman says "the decision was taken, as usual, by a small group - Harold Wilson, Denis Healey, Roy Jenkins, James Callaghan and Roy Mason" to proceed with the Chevaline front-end update to "preserve targetting capabilities." [Ref. 5: p. 52] This is in keeping with traditional British political practice of a "a decision taken by a very small circle of officials and senior cabinet ministers... (it) is profoundly undemocratic, but accords with the British tradition of secrecy, and of informing the public, and Parliament, not consulting them." [Ref. 7: p. 8]

Freedman speaks of this practice when he mentions that the Chevaline project was almost cancelled in 1977 because

of escalating costs, but because this would have been interpreted as a lack of governmental resolve and since "this was not the Government's intention... so the line of least resistance was to let the programme run its course." [Ref. 5: p. 54] He further comments that "the tradition of secret and bipartisan policy-making, with its emphasis on continuity, was one reason why the Conservatives chose Chevaline in 1973 and why the programme survived in 1977." [Ref. 5: p. 54]

Robin Ranger outlines the Government's position on the Trident decision when he says that "it was taken in accordance with British Parliamentary traditions. The Government made the decision and laid it before Parliament for debate and approval. More public discussion would have been desirable but impossible, given the security problem and the sensitivity of the issues." [Ref. 7: p. 9] Ranger's analysis of the Government's reasoning is that "provided security" is understood as a synonym for "political sensitivities," this statement is surprisingly truthful. A prolonged, informed, public debate would raise all the awkward issues indicated... vis-a-vis the U.S. and Britain's Nato-Europe allies. It would also stimulate public opposition in the U.K. to the British deterrent and to the stationing of U.S. GLCM in the UK." [Ref. 7: p. 9] In the commenting on the Trident decision, Ranger emphasizes what he considers to be the inherent arrogance built-in to the so-called British democracy when he says:

"since the British Establishment had decided the decision to its satisfaction, this was, in its view, sufficient: what can outsiders... add... ? Nothing!" [Ref. 7: p. 9]

The question of Polaris replacement was first surfaced publicly with Ian Smart's articles, but Lawrence Freedman tells us that in the middle of 1977, the Ministry of Defence also suggested coincidentally that the problem required consideration. Freedman indicates that "as normal in these matters, the Prime Minister convened a small, private ad hoc group to consider these studies. This was outside the formal cabinet structure (it even lacked a Gen number, used for subcommittees in Labour Cabinets). The Committee was composed of Prime Minister Callaghan; Denis Healey, Chancellor of the Exchequer; David Owen, Foreign Secretary; and Fred Mulley, Defence Secretary. [Ref. 56: p. 4]

This Cabinet 'committee of four' established two working parties in Whitehall which began to inquire into the Polaris replacement in January 1978. One, headed by Sir Anthony Duff, the Deputy Under-Secretary at the Foreign Office, concerned itself with the military and political implications of a successor for Polaris. The second, a technical group chaired by Professor Ronald Mason, Chief Scientific Advisor to the Ministry of Defence, studied the alternative delivery systems available. Peter Hennessy indicates that the Cabinet committee had reached no firm conclusions by the time Parliament was dissolved for elections in 1979, but several things had

become clear: "The intention was to proceed to a third generation despite the 1974 Manifesto commitment... (and) the need for any Polaris replacement to be submarine borne." [Ref. 56: p. 4]

The 1974 Labour Party Manifesto referred to above, rejected new deterrent systems, saying in part: "We shall maintain its effectiveness. We do not intend to move to a new generation of strategic nuclear weapons." [Ref. 5: p. 55] Hennessy indicates that one of the results of the "highly secret ratiocination" of the 'committee of four' was the compromise wording on the deterrent that Prime Minister Callaghan managed to insert into the Labour Party's 1979 Election Manifesto:

> In 1974, we renounced any intention of moving towards the production of a new generation of nuclear weapons or a successor to the Polaris nuclear force; we reiterate our belief that this is the best course for Britain. But many great issues affecting our allies and the world are involved, and a new round of Strategic Arms Limitation negotiations will soon begin. We think it is essential that there must be a full and informed debate about these issues in the country before any decision is taken. [Ref. 56: p. 4]

Even though no ministerial decisions were taken on this matter by the Callaghan Government before the 1979 election, "the possibility that a replacement would be necessary and that if so, it would require American help, was sufficient to allow Mr. Callaghan, whose instincts were in favour of replacement, to raise the issue tentatively with President Carter during the Guadeloupe summit of early January 1979."

[Ref. 5: p. 61] The fact that the Labour Government had not ruled out a replacement for Polaris was made clear by Defence Secretary Fred Mulley in a Parliamentary debate on election eve when he remarked: "I could not say today that in no circumstances would I be in favour of moving towards a new generation. I accept that the arguments for and against are very finely balanced. The answer depends a lot on what happens in the next year or two." [Ref. 57]

The Conservative victory in British elections in May 1979 brought to power a Government committed to the maintenance of an effective nuclear deterrent. Peter Jenkins, a commentator for the Guardian remarks that "there has never been the slightest doubt that the Thatcher Government would replace Polaris and go for the Trident. That choice was effectively made in opposition. The Mandarinate had determined upon a replacement in the same class as the Polaris and made sure the decision was not pre-empted by a lame-duck Labour Government." [Ref. 58: p. 13]

One of the first subcommittees set up by the new Government was MISC 7, whose first priority was dealing with the British nuclear force. It consisted of Prime Minister Margaret Thatcher and Home Secretary William Whitelaw, Chancellor of the Exchequer Geoffrey Howe and the Defence and Foreign Secretaries, Francis Pym and Lord Carrington. [Ref. 5: p. 62] This committee was able to move rapidly forward because it had available to it the studies of Duff

and Mason which had been reworked with "new tops and tails." [Ref. 56: p. 4] Lawrence Freedman implies that MISC 7 moved rapidly "to a position that the Polaris force should be replaced in the early 1990s by a new submarine-launched missile system." [Ref. 5: p. 63] This plan apparently had the support of the Chiefs of Staff, under the chairmanship of Admiral Sir Terrence Lewin, although some worry was expressed about the budgetary consequences for conventional forces.

Initial 'soundings' as to the American willingness to continue the 'special relationship' which had provided Polaris were made by Secretary Pym when he met with the U.S. Secretary of defense Harold Brown in July 1979. This meeting laid the ground work for Mrs. Thatcher to ask President Carter for assistance when they met in December 1979. When American officials began to consider appropriate responses, they "concluded that a request should be treated positively, not as an act of charity but because of wider political and strategic benefits." [Ref. 5: p. 66] Freedman points out "the American Defense Department report of January 1980 contains, for the first time, a positive endorsement of the British force: "The close US cooperation with this capability reflects our judgement that the British force, which is committed to NATO, contributes to our mutual defense interests." [Ref. 5: p. 67]

The communique resulting from the Thatcher-Carter summit noted agreement "on the importance of maintaining a credible British strategic deterrent and US/UK strategic cooperation' and that the two countries 'should continue their discussions of the most appropriate means of achieving these objectives for the future." [Ref. 5: p. 67] Having agreed to cooperation in principle, the British, despite claims to the contrary, were kept waiting by the Americans for the most opportune time for a formal British request. President Carter's political fortunes were in flux; the invasion of Afghanistan had raised questions about SALT II and detente; and there was some question as to the financial aspects of the Trident deal. All of these questions had an impact on the announcement date.

Ian Mather tells us that the actual British commitment to purchase 100 Trident missiles was made on Friday, 13 June 1980, when Michael Quinlan, Deputy Under-Secretary of Strategic Programs (MOD) and Walt Slocombe, U.S. Deputy Under-Secretary of Defense for Policy Planning signed the required letters of exchange on the 'boot' (trunk) of a car. [Ref. 59: p. 3] The announcement of the purchase had originally been scheduled for July 4th, but was delayed because West Germany's Chancellor Helmut Schmidt was on a trip to Moscow and such an announcement could have opened him to private and public criticism from the Soviets which would have been politically harmful in the West Germany and

possibly devisive within the Alliance. Gilbert Lewthwaite reports that the U.S. welcomed the British Trident decision strategically, economically and politically. He goes on to say that "officials denied that the timing of the administration's announcement was influenced by the Republican Party convention in Detroit, and asserted that it was keyed to the return of Congress next week, and to the British Parliamentary timetable." [Ref. 60: p. 1] The Trident announcement was made the day before Ronald Reagan was formally nominated as the Republican presidential candidate and may have been an attempt by the Carter administration to strengthen the President's image on defense.

Ian Mather notes that "Callaghan (the former Prime Minister) had decided in principle to buy the Trident missile from the United States. Three senior sources connected with the American negotiations that ended in the deal announced last week told me that Mr. Callaghan was strongly supported in his decision by the then Defence Minister Fred Mulley. After commissioning intensive studies, the two men decided to 'bite the bullet' and buy Trident if Labour won the election." [Ref. 59: p. 3] With the Conservatives coming to power and dedicated to the continuation of the strategic nuclear deterrent force, there was no need for the Labour hierarchy to come to public grips with their apparent private conclusions that the Polaris force needed to be replaced.

Two issues resolved only at the end of the protracted negotiations between the United States and Britain concerned the warhead chosen and the total cost of the American equipment. The British had initially wanted to develop their own warhead to maintain the high level of technical expertise at Aldermaston Atomic Weapons Research Establishment (AWRE) which had been achieved in the Chevaline programme. Additionally, some opposition developed in the U.S. State Department to the sale of multiple independently targettable reentry vehicles (MIRV) because of their possible impact on future arms limitation negotiations. [Ref. 59: p. 3] Mather tells us that this "led to a brief British flirtation with the idea of fitting an improved warhead system (Chevaline)... on its Tridents." He goes on to say:

> the Chevaline-Trident idea was quickly dropped... because of the huge costs to the British of testing it at Cape Canaveral and because the American Government genuinely wanted Britain to buy the full Trident, since its greater range of 4000 miles and multiple warhead capacity adds to the Western Arsenal facing Russia.

The issue of cost was resolved by following the 5% surcharge descended from the original Nassau formula developed in 1962. The Carter Government apparently wanted to make the sale price as cheap as possible to enhance its attractiveness to the British, but was forced "to mollify Congressional opposition to any sale which did not make the purchaser pay a fair share of the research and development costs." [Ref. 59: p. 3] The 5% extra tacked on for R&D was

thus a compromise position acceptable to both sides. The British, in fact, were quite pleased with the terms of the purchase agreement, which were much better than had generally been anticipated. The reason was obvious, of course, the Americans really wanted the British to buy Trident for reasons of strategic interest and they were prepared to make the agreement sufficiently attractive to virtually guarantee British participation.

The Conservative Government of Margaret Thatcher was firmly committed to the Trident purchase, but its ability to shephard that decision through to fruition remains a matter of future political resolve. One of the principal reasons the Government had for committing itself quickly to the Trident was to get the programme well under way before there was a real likelihood that future Labour governments might overturn the decision. Ian Bellany remarks on the decision that:

> the arguments for and against proceeding to a new generation of strategic nuclear force are so finely balanced that historians may come to say, uncharacteristically, that the deciding factors in 1980 were of a haphazard kind: the personality of the British Prime Minister, the personality and fortunes of the American President and his relations with the Senate' and the state of Soviet-American relations. [Ref. 29: p. 9]

Bellany goes on to say that "these haphazard elements have conspired to create a window of opportunity for a British approach to the United States for a successor to Polaris." [Ref. 29: p. 9] It was through this window that the British

Government reached and secured Trident as the mainstay of its strategic nuclear retaliatory force of the 21st Century.

V. POLITICAL IMPLICATIONS AND DOMESTIC CONSIDERATIONS

The British strategic deterrent force is designed to influence the minds and actions of potential aggressors by threatening an unacceptable level of nuclear retribution if British interests are jeopardized or attacked. The strategic deterrent force which is the guarantor of this punishment is chiefly a political rather than a military instrument and despite the focus on technical aspects which has dominated the Polaris replacement debate, the crucial question for the decision's durability is what political effects will result.

The deployment of a British Trident force will have a major politico-strategic impact on Western defenses, as did the decision to seek such a capability and the abilities of the governments involved in such a momentous decision to carry it through to fruition. Each of these actions carry with them political implications outside the sphere of their technical competence. Each affects and is affected by the internal politics of the countries involved.

In the case of the British Trident decision, Presidents and Prime Ministers come and go and political parties change power. All have different philosophical goals and methods of achieving them. In the harsh reality of the political marketplace, where righteousness and principle are too often measured in dollars and pounds sterling, the ability of any

controversial policy or program to survive a 10-12 year acquisition period is slim indeed. It demands a strong resolve and a continuing political consensus that rises above politics. The Polaris program, by virtue of its economy and lack of political visibility, enjoyed a unique degree of national political support. The requirement for a continued British strategic nuclear deterrent apparently remains publicly and politically supported throughout Britain. Whether this general acceptance can be translated into a deployed Trident capability depends a great deal on whether or not this program can equal the success of Polaris in not 'rocking the domestic political boat.'

NATO has been the prime bulwark against Soviet aggression and adventurism in Western Europe since its inception in 1950. The British military withdrawal from East of Suez has resulted in NATO becoming the central focus of British defense efforts. Despite the excellent levels of strength, cooperation and stability that have been achieved within the alliance's military command, domestic and international strains continue to pull at the political fabric of the various nations involved. This turmoil can only be expected to increase as the political requirements of each country develop in their own uniquely national manner. The British decision to build and deploy Trident missile-firing submarines will affect the cohesiveness of the alliance, as well as its ability to respond to or deter Soviet military aggression. Western

European stability and political resolve in successfully meeting the international and political challenges that will confront NATO in future, will determine to a large degree the political wisdom of the British choice for a new strategic deterrent force.

The Daily Telegraph headlined the British Government's decision to purchase the Trident SLBM as "Top-Grade Deterrence." [Ref. 61: p. 16] Ian Bellany remarks that "the cruise missile is unlikely to be matched, as a technological tour de force, in either France or the Soviet Union by the mid-1990s... the Trident C4, on the other hand, will be unmatched by anything the Soviets or the French have before the turn of the century." [Ref. 29: p. 12] But despite the general consensus that it is a good idea for Britain to maintain an effective, credible strategic deterrent, the choice of Trident has not met with unanimous approval. Ian Mather, the Observer's defence correspondent, comments that:

> critics of the Trident are not all pacifists or unilateral disarmers. A fascinating feature of recent defence seminars has been the number of 'experts' voicing doubts about the decision. Most of the argument revolves around cost. [Ref. 62: p. 13]

The Trident decision and its manner of implementation were immediately criticized by William Rodgers, then chief spokesman for the Labour Party on defense matters, "the figures Mr. Pym has given, (the decision) raises difficult financial matters... with limited national resources at a time of no or slow growth, this program will preempt a large

sum of money which might go toward more worthy programs." [Ref. 63: p. 24] Rogers also went on to criticize the lack of discussion in the cabinet and debate in Parliament on the decision to adopt Trident and concluded by saying: "In these circumstances, many of us are deeply skeptical about the decision. We believe the case for buying Trident has not been made out and I believe we simply cannot approve it." [Ref. 63: p. 25] David Brown reports that "the Liberal Party, smallest of the three major political parties in Britain, also opposed the sale on the grounds that Britain did not need any independent nuclear deterrent force." [Ref. 63: p. 25]

One of the more interesting features of the public discussion that preceded the formal selection of the Trident missile as the Polaris replacement was a series of letters to the Times by notable defense experts, arguing the merits and demerits of the situation. Field Marshal Lord Carver, former Chief of the Joint Staff, whom Lord Gladwyn, defense correspondent for the Daily Telegraph, calls "the odd man out in Service circles," [Ref. 64: p. 3] is opposed to the renewal of the British 'strategic' deterrent on the grounds that he cannot conceive of any situation in which its independent use would seem justified. Carver says:

> I can conceive of no circumstances in which it would be right, reasonable or realistic for the Prime Minister of the United Kingdom to authorize the use of British nuclear weapons, when the President of the United States was not prepared to authorize the use of any US nuclear weapons; nor do I believe that the Russians would believe it to be a realistic assumption that he or she would. [Ref. 65: ltrs]

Lord Carver does not follow the logic of what he calls unilateral nuclear disarmers. He believes in the reasons successive British governments of different political persuasion have maintained a nuclear capability and he does not desire to alter this arrangement because of the "profound political impact it would have - in this country, among our allies, on our potential enemies and in the world at large." [Ref. 65: ltrs] What he does advocate is the use of nuclear weapons in theater warfare roles. This he argues is financially affordable and will not affect the vital re-equipment programs needed by the three services as much as would the construction of a Trident SLBM-equipped strategic deterrent squadron. Dr. Hew Strachan emphasizes a key point when he says "as Lord Carver has so rightly pointed out, if NATO is the cornerstone of our strategy, there is no logical case for an independent strategic deterrent." [Ref. 66: ltrs]

Lord Carver's arguments are countered by Marshal of the Royal Air Force Sir Neil Cameron who says that the question is really about deterrence, or the ability to influence the adversary. In advocating the retention of theater nuclear weapons, Lord Carver is, in reality, talking about a nuclear warfighting capability. A strategic nuclear deterrent force is designed around a war-deterring mission. Additionally, without a strategic deterrent to back up theater systems, the latter would be impractical to use against the Soviet Union because of its ability to escalate the level of violence

higher than can the British. [Ref. 67: ltrs] Sir Neil favors continuing the present strategic force in the form of Trident, not only because of its deterrent effect, but also as an offset to French nuclear and German conventional dominance on the continent. [Ref. 64: p. 3]

Jonathan Alford of the International Institute for Strategic Studies addresses several subjects affecting the Trident decision in a letter to the Times. One of these concerns is cost, about which he says that it "seems abundantly clear that the decision to go for Trident will have a profound impact on Britain's conventional capabilities." He says further that:

> what Sir Neil Cameron does not point out is that 7 per cent of the budget (Trident estimate) amounts to almost 12 per cent of the money set aside for equipment procurement as a whole and no less than 26 per cent of the amount set aside this year for the production of new equipment. Something big will have to go in order to absorb a Trident programme... there are alternatives available - either the run-on of Polaris or a cruise missile variant - which are undeniably less up-market than Trident but which will do the job while still allowing us to maintain our conventional capabilities more or less unimpaired." [Ref. 68: ltrs]

Admiral of the Fleet Lord Hill-Norton, another former Chief of the Defence Staff and Chairman of the NATO Committee, advocates acquisition of the Trident SLBM along the same lines as Sir Neil Cameron. He comments that "Sir Neil has rightly pointed out that without the strategic weapons we might as well give up our so-called theatre and nuclear battlefield weapons too... despite what Lord Carver has said about

retaining a tactical nuclear capability... he is, in effect, proposing that we should, unilaterally give up all nuclear weapons." [Ref. 69: ltrs] Summing up his feelings, Hill-Norton says:

> I prefer, and so does Sir Neil, to continue the policy wisely followed by her Majesty's Government, of both political parties, for the last 27 years, which enables us to protect our vital interests against threats of blackmail, or the actual use of force, against both our European allies and this realm. [Ref. 69: ltrs]

Lord Caccia, the former Chairman of the Joint Intelligence Committee of the Chiefs of Staff, argues persuasively for the Trident missile on the grounds that we cannot predict what will happen to the international order during the projected life of the new strategic deterrent. Although Britain is securely tied to NATO as the cornerstone of its national security, no one can possibly know what will be the condition of that alliance as we move into a new century. Caccia believes that the British Government should retain "the largest feasible number of options to provide for the unpredictable." Trident is seen as being the best system to do that. [Ref. 70: ltrs]

Lord Greenhill of Barrow, writing to the Times the following day, made the same argument, that in a world of uncertainties, Britain should value a credible deterrent force to protect against the unknown day when its security might be threatened in a world far different than the one presently existing. [Ref. 71: ltrs]

The civil experts, as documented above, end up on both sides of the Trident decision. Except for Lord Carver, there seems little disagreement that the maintenance of a strategic deterrent is a good thing, the question revolves around whether Britain needs or can use the leap-step jump in capabilities that Trident brings and whether or not she can afford them without some other crippling curtailment. One of the most knowledgeable experts on the dollar/pounds sterling costs of the Trident purchase and its impact on British military planning is David Greenwood whose analysis "The Polaris Successor System: At What Cost?" is the most comprehensive treatment of the subject.

Writing in the Sunday Times following the Thatcher Government's announcement of the Trident deal, Greenwood analyzed the cost question as being divided into two parts: is the 5000 million pounds sterling estimate realistic; and given the answer to the first part, can the government buy Trident without damaging the rest of the defence programme and the budget? Greenwood estimates that given the large number of unknowns in the strategic equation at the time of the announcement, "the Government will be hard-pressed to hold the cost of a four-boat Trident force at 5000 million pounds." [Ref. 72: p. 17] Among these unknown variables are the submarine design; the probable expansion of submarine construction and support facilities; upgraded communications and any additional costs associated with warhead design information and weapons-grade material that might be required.

Greenwood is more emphatic in addressing the second part of the question he posed, as he remarks:

> Unless the Defence Minister, Francis Pym, has discovered a way to have his military cake and eat it, something in the current defence programme and budget will have to give up to 'make room' for the Trident expenditure. [Ref. 72: p. 17]

He goes on to note that the "Government maintains it can buy Trident without prejudice to the country's 'all-round contribution to Allied deterrence and defence'" and therefore the Government must intend to make room by "piecemeal diminution in the scale of spending on conventional forces." [Ref. 72: p. 17]

Greenwood sees the services having to tolerate "over-stretch, and undernourishment... with further effect on reduced combat effectiveness and morale. Such degradation and dilution of the quality of the conventional forces seems inescapable as time goes by, at least for so long as there is an insistence on keeping up the appearance of an 'all-round contribution to the Alliance.'" [Ref. 72: p. 17] Ian Mather quotes Greenwood as saying the "chance other new conventional weapons will have to be sacrificed is high." [Ref. 62: p. 13] Mather goes on to say "Greenwood postulates two ways in which Trident could be accommodated. Both involve huge cuts, perhaps in Britain's naval contribution to NATO in the Atlantic, or in British forces in Germany." [Ref. 62: p. 13] In his major work on the subject Greenwood himself concludes: " 'the price' in terms of the alternative defence provision

that will have to be foregone is the abandonment of the notion that the United Kingdom should make a balanced contribution to the Atlantic Alliance and that it should sustain balanced forces." [Ref. 29: p. 138]

Lawrence Freedman refers to the cost issue's future impact: "when the crunch comes in the 1980s, Ministers, whether Labour or Conservative, will be looking for cuts - and bang in the middle of their expenditure programmes is going to be the nuclear force. Whereas it has managed to escape in the past it is not going to avoid cost-cutting scrutiny in the future, because by then it will be one of the chief current spending programmes." [Ref. 29: p. 156] Freedman goes on to say:

> In the end I find myself in agreement with Greenwood not because of the absolute cost of the programme but because of the likely pressure on resources in the British economy over the next decade. It is sheer irresponsibility for the Secretary of State for Defence to say that 4000 to 5000 million pounds can be spent without effect elsewhere, because as Greenwood argues, in the end you cannot have your cake and eat it. [Ref. 29: p. 156]

David Brown reports that the fact that the bulk of the Trident funding will be spent over a 15-year period was a major reason for the selection of Trident as Polaris' replacement. He says "the ability to spread the cost of the Trident over this relatively long period of time, with the bulk of the cost coming several years into the program, is one of the major reasons the Trident was selected." [Ref. 63: p. 24] Brown further reports that about 70% of the cost

of the Trident program will be spent in Great Britain. Unofficial estimates are that the program will provide as many as 200,000 jobs during its lifetime, mostly in the ship building industry, but also in a number of small supplier firms, especially in electronics areas, scattered around the country. This should help deflect the criticism that the Conservative Government has been taking about unemployment and make it harder for future Labour governments to tamper with. [Ref. 73: p. 44]

Still the question of British ability to pay for Trident remains very real, especially in terms of its impact on the country's conventional military posture. Peter Jenkins comments that "Britain is not economically fit enough to attempt the strategic over-stretch upon which Conservative governments usually insist. As a national deterrent of last resort the Polaris would have done for awhile yet. The Trident is too elaborate and expensive for that purpose; what other purpose it is intended to serve is not yet clear. Its relevance to NATO is limited and may impair Britain's contribution to the redress of military balance in Europe where it really matters." [Ref. 58: p. 13]

The impact of the Trident decision on Britain's conventional forces may be even larger than anyone has predicted. Former U.S. Navy Chief of Naval Operations, Elmo Zumwalt, writing with Worth Bagley, a retired four-star admiral, has said that "under current plans, Britain will spend about

$20 billion" on the Trident program. [Ref. 74: p. 21] Zumwalt goes on to accuse the United States of abetting "a nuclear ally - the United Kingdom - which is giving priority to modernizing its submarine ballistic force at the penalty of weakening its non-nuclear forces." He goes on to say "the return for the United States is a costly U.K. national nuclear force that contributes little to NATO's or to America's safety and causes a reduction of 20-30 percent in Britain's conventionally armed Army and Navy." [Ref. 74: p. 21]

Leonard Downie, Jr., a staff writer for the Washington Post, in announcing the Trident decision reports that "although the United States is making unspecified concessions on the price of Trident, there are fears among military experts... that its cost may force Britain to make cuts in its still large contribution to NATO's non-nuclear forces." [Ref. 75: p. 1] Downie adds that "the cost of Trident in particular is likely to embolden the opposition Labour Party and a growing anti-nuclear weapons lobby to campaign against this expensive modernization of Britain's military forces while the country's postwar welfare state social security programs are being whittled down." He summarizes the unique danger that this opposition highlights when he says: "although the Labor Party cannot stop Thatcher from going ahead with Trident, it could reverse her decision if it replaced the Conservatives in government before the system was in operation." [Ref. 75: p. 1]

In commenting on the Thatcher Government's Trident decision, Col Jonathan Alford of IISS says the Trident program will "substantially increase Britain's nuclear capability when it doesn't need to do so." Arguing an "admittedly Gaullist" line, Alford feels that a deterrent independent of NATO control - although one not as costly as Trident - is needed to give Britain "a bargaining position vis-a-vis the Soviet Union." [Ref. 76: p. 5]

An editorial in the Times poses the question, "rather than spend billions of pounds on acquiring and maintaining a weapon which is unlikely ever to be used, should we not concentrate our limited resources upon conventional equipment? If NATO's forces showed themselves well able to defend the West against an offensive by conventional means, then would not the nuclear threshold be raised - and indeed the threat of war altogether removed." [Ref. 77: p. 12] No real answer is given, but the point is emphasized that the first priority must be an informed public debate on the issues involved.

In terms of domestic implications, one of the most serious questions raised has been the general veil of secrecy that was maintained over the Conservative Government's decision to purchase Trident. The Economist, in an editorial entitled "Dumb Defence," was vigorously raising the issue of secrecy when Chevaline was announced. [Ref. 78: p. 18] The editorial goes on to say "the government's latest decision about

Britain's nuclear deterrent is right. Silence about its reasoning is wrong." The point is emphasized that only a political leadership and a public opinion, familiar with, and largely convinced by, the arguments for a strong, and changing nuclear deterrence would be able to muster the political will and resolve needed to complete a multi-year weapon acquisition program. [Ref. 78: p. 18]

Hugo Young in the Sunday Times comments "my point is that such a judgement, which we are all entitled to attempt, cannot be reached sensibly in a regime of secrecy, not to say calculated deception, and in the context of closed debate." [Ref. 79: p. 22] The Manchester Guardian comments on the choice of the Trident missile as a replacement in an editorial entitled "Settling for Trident - a Contemptuous Scurry." [Ref. 80: p. 4] It goes on:

> After a bare minimum of discussion (and that still inconclusive) the Government has committed Britain to the most adventurous and most expensive of the options open to it in replacing the Polaris missile system. That the decision is, in our opinion, the wrong one on grounds of both cost and strategic purpose is almost less regrettable than the way the decision was taken. [Ref. 80: p. 4]

The crux of this argument is that the Trident decision by virtue of its expense and qualitative step increase will continue to be very controversial. Without genuinely well-informed public support, the program may not survive the political changes likely to occur during its construction and deployment, yet this seems to be a factor neglected by the Thatcher Government. [Ref. 79: p. 22]

Henry Stanhope discusses the "opportunity-costs" and conventional arms impact of the Trident purchase in the following manner: "the equipment programmes of all three services are likely to be affected by the Government's decision to invest in the Trident I missile system as a 5000 million pound replacement for the Polaris in the 1990s. This is despite the confidence of both the Cabinet and the Ministry of Defence that Britain can accommodate the additional cost without severely damaging its conventional forces." [Ref. 81: p. 3] Stanhope mentions that the RAF's plans for a Jaguar replacement aircraft will probably be tabled. The Royal Navy's hunter-killer submarine program will almost certainly be affected by Trident as the Vickers yard at Barrow-in-Furness is now the only shipyard capable of building nuclear submarines and their will undoubtedly be some delays and juggling of schedules to accommodate the required Trident construction program. [Ref. 80: p. 3]

Peter Hennessy, writing in the Times, headlines a potential problem with the Trident replacement program in discussing the capabilities of the Atomic Weapons Research Establishment at Aldermaston, Berkshire. Recruitment of sufficient numbers of qualified health scientists is lagging way behind requirements and will impact any attempt to handle the scope of operations expected to increase with the Trident warhead program. [Ref. 82: p. 9] This is partially related to safety failures which occurred at the facility in prior years.

The increased MIRV capabilities of Trident with its eight reentry vehicles present a serious challenge to British stockpiles of nuclear material. The Polaris ballistic missile force, even with the Chevaline update, never required more than a total of 192 separate warheads. The new Trident system could deploy over 500 individual warheads at any single time. The requirement to find enough material to produce the bombs will stretch British resources to the limit and, in fact, will probably require U.S. assistance or reduction of other British nuclear stockpiles, especially in the area of theater weapons.

If the technical adjustments needed to support the Trident deployment are considerable, the political risks associated with the Labor Party and its anti-nuclear position are even greater. At the 1981 party conference in Brighton, the Labor Party "reaffirmed... its commitment to unilateral nuclear disarmament and voted to remove all nuclear military bases from Britain soil." [Ref. 83: p. 7] The motion adopted by the Labor Party also called for "substantially" cutting defense spending and in the area of nuclear weapons said it supported the shutdown of: all nuclear bases, British or American, on British soil or direct contribution to the creation of a European nuclear weapon-free zone and as a powerful British initiative in the wider process of nuclear disarmament. [Ref. 83: p. 7] This action by Labor Party is awkward because previous Labor Government's have supported

only multilateral disarmament and, under Prime Ministers Harold Wilson and James Callaghan, actively maintained an independent national nuclear deterrent and supported the stationing of both British and American nuclear weapons under the auspices of NATO.

What the outcome of the party conference also highlighted is the growing estrangement between the moderate and left wings of the Labor Party. As an example, the Labor shadow defense spokesman, Brynmor John, a moderate, was prevented from speaking on the nuclear question by Alex Kitson, the conference chairman and an outspoken leftist. Significant differences also exist between party leader Michael Foot and deputy leader Denis Healey. Foot has long advocated unilateral disarmament, while Healey, as defense minister in the Wilson government, was in favor of maintaining an independent nuclear deterrent as long as the Soviets continued to build up their strategic strike forces. [Ref. 83: p. 7]

Several questions remain to be answered about whether a future Labor government would dismantle Britain's independent nuclear deterrent. Suffice it to say that a government truly dedicated to unilateral disarmament would be more likely to do so than one not quite so rabid. The future of the Labor Party also remains open to conjecture. The positions of the various wings of the party are becoming increasingly isolated from one another, as devisive issues like nuclear weapons arise. This may act as a counterweight to the Labor

position and make it that much more difficult for the party to come to power.

The Trident weapons system is the best one of its kind presently in existence. Its acquisition would vastly increase the weight and accuracy of nuclear weapons with which Britain could threaten the Soviet Union. Against the backdrop of domestic political constraints and financial limitations, however, it will require some real political manuevering and dogged determination on the part of the Conservative Party to bring its decision to purchase and deploy Trident to a successful conclusion.

VI. REFLECTIONS AND CONCLUSIONS

In examining the strategic and political implications surrounding the British Government's decision to acquire and deploy the new American Trident I (C4) submarine-launched ballistic missile, Lawrence Freedman attempts to offer a realistic perspective about the decision by asking his readers to imagine a harried Royal Air Force commander taking time, during the Battle of Britain, to reflect on the possible strategic environment forty years hence, in 1980, and to then sanction production of a single system that would be the final, sole guarantee of British national sovereignty during that period. [Ref. 54: p. 13]

The analogy in not as far fetched as it might at first seem. With a currently deployed capable and credible strategic national nuclear deterrent force, only recently upgraded at substantial expense to insure high probability of target penetration, the British have made the political and technical decision to commence procurement of a new system designed to remain effective to about the year 2020. Just as the RAF commander would have had no concept of the military or strategic conditions existing today upon which to base his decision, the analysts, strategists and politicians who opted for Trident are faced with the same set of unknowns. Despite the degree to which current operations analysis and other computer-oriented prediction systems have been refined over

recent decades, it would be few leaders indeed who would commit the fate of their nation to such predictions of the probable future.

To a nation with the proud traditions of the United Kingdom, the ability to independently chart its own course of action has always been paramount. Having to rely on the United States to provide the technically sophisticated equipment necessary in the current strategic arena to maintain an effective, 'independent' national deterrent may be a sour pill for the British to swallow, but it is a realistic acceptance of the political, military and economic conditions existing and a directed effort on their part to use these factors to their maximum advantage.

The primary driving force behind the British decision to buy Trident was the practical necessity to stay reasonably in step with the Americans. Britain's political leadership felt unable to deploy more than a single type of strategic nuclear weapon. With unique requirements for deterrent survivability and penetrability, the submarine-launched ballistic missile appeared the only choice, hence Trident. The initial British attempt at acquisition of a major American strategic system, the Skybolt air-launched ballistic missile, resulted from their inability to develop the capability indigenously within the fiscal constraints imposed by a weakened economy. Polaris became British almost by accident, as a political expedient. Its purchase has proven remarkably

successful from almost every British point of view. It has been relatively cheap, reliable and politically invisible.

If the British needed further convincing of the correctness of their strategic reasoning, it was provided by the Polaris Improvement Program, or Chevaline. Technically successful, this 'major rework of the missile front end' was economically a disaster. Costing around 1000 million pounds sterling, Chevaline exceeded its initial cost estimates over two-fold. Even allowing for inflation, this represented a significant increase which under different circumstances might very well have led to cancellation of the program. To avoid sending out the wrong political-strategic signals about Britain's political resolve to the Soviets, the program was carried through to a technically successful conclusion. It did create, however, a strong and vivid reminder, to British strategists considering the Polaris replacement question, of the unknown difficulties associated with the research, development and testing of any new strategic system, difficulties which are all too quickly translated into money demands on an already overstretched national treasury.

With the Chevaline 'bad experience' fresh in their minds and just barely having begun Chevaline's deployment on submarines of the Royal Navy's Polaris squadron, British politicians moved quickly on to the issue of a successor system to Polaris. This action was undoubtedly quickened by the victory of the Conservative Party in 1979 which brought

to power a government already dedicated to upgrading British prestige and military readiness, especially in the area of nuclear weapons. The cruise missile option was never seriously considered in the final decision because it was not yet a proven system; because it has significant range limitations in its current versions; and because it would not be any cheaper than Trident, if deployed on submarines in the numbers needed to achieve the effectiveness of the current deterrent force.

Other ballistic options besides Trident were considered, including Poseidon, an up-graded Polaris, as well as possible collaboration with the French. All were rejected for the simple fact that at some point they would all require improvements to maintain their reliability and effectiveness; and the cost would have to be borne wholly by the British, an alternative viewed as especially unattractive in the wake of the Chevaline experience.

Trident was the 'best' system available and the United States was prepared to offer it to the British under exceptionally good financial terms, much better, in fact, than many of the British analysts of the question had thought possible. The fact remains that the best deal was still enormously expensive, abosrbing at best estimate, at least 25 percent of the military budget allocation for new equipment, over the period of years of heaviest expenditure, roughly 1985-1990. The ability of the British economy in general, and military allocations specifically, to absorb this

significant expense is open to question. It is unlikely that all the planned conventional armaments programs could be carried through as conceived, given the normal chops and changes that have characterized British defense planning in the post-war period. To overlay this large additional requirement of at least 5000 million pounds on the military budget, is to ask for almost certain spending cuts that will limit, reduce or eliminate many currently planned conventional capabilities. This will, in one manner or another, lower the threshold for conventional aggression in the European theater, unless British allies are able to pick up the military slack which will be created.

The British strategic nuclear deterrent is designed around the 'Moscow criteria', that is to be able, in a situation of last resort, to attack the center of the Soviet power structure successfully and impose societal, rather than military, damage of unacceptable proportions to the Soviet political leadership. This is in some ways an arbitrary and artificial criteria established by military planners, as tremendous societal damage to the Soviet political control structure could be achieved by attacking industrial and population centers which are undefended by ABM systems. If we use the 'Moscow criteria' as the minimum level of deterrence acceptable to British strategists, there is still a real question as to why they are acquiring the Trident missile system.

If the British SLBM's are launched as a component of a massive allied retaliation, their problems of penetrability are minimized because of the magnitude and scope of the task that would confront Soviet defenses, wherever they might be installed. If the credibility of the British deterrent is established by its ability to threaten Moscow in extreme circumstances, then that ability is not significantly enhanced by the choice of Trident over the Polaris with Chevaline up-grade. If the Soviets can successfully defend themselves against a British Chevaline attack, then it is likely that they can do the same against any national British attack, unsupported by the United States. If they could not accomplish this active defense, then the effectiveness of the MRVed Polaris would continue to be as generally excellent as it is considered today. The deployment of the Trident missile system would increase the total number of warheads a British strategic submarine force could and also their accuracy and total equivalent megatonnage (EMT), but this is a capability which has not been previously considered necessary by British planners. Certainly, even with Trident I, the British could never hope to individually pose a counterforce threat to the Soviets. As part of a coordinated allied attack, their contribution in this regard would prove more useful.

The basic question that must be answered is whether the British can successfully absorb the political and financial opportunity-costs of the Trident purchase. It is quite

possible that they cannot and will not unless subsidized to even greater extent by the United States. Polaris escaped emasculation at the hands of the Labour Party, despite their rhetoric to the contrary, because it was relatively inexpensive. No matter how favorable a deal Trident is, it will not be cheap. The political visibility it acquires will be turned into political controversy which may very well threaten its actual deployment. This will be helped by the undoubted growing dissatisfaction of the three services whose conventional capabilities will be significantly and negatively affected by the Trident purchase. The French devote a much larger share of their military budget, around 20 percent, to nuclear weapons. Unless the British are increasingly prepared to accept this sort of commitment, the deployment of the Trident missile force will become increasingly difficult to support militarily and politically. I don't believe the British or their European allies are willing to accept the degradation that will almost surely take place in British conventional forces. At the same time, and given the social and economic difficulties existing throughout Britain, it is unlikely that a larger percentage of the British budget can be devoted to defense to cover the extra expenses that Trident will entail.

The Trident I is designed to come into active service in the Royal Navy in the early 1990's, when it is scheduled to be withdrawn from use by the U.S. Navy in favor of the larger and even more

accurate Trident II (D5) missile. Many of the support difficulties which the Britain see as handicapping the Polaris, Poseidon and other existing ballistic missiles will then confront the British Trident. A squadron of Trident missile-firing submarines will deploy a range of significant new capabilities that the British have never possessed in a ballistic missile before; longer range; greater throw-weight; and higher accuracy. The point to be made is that the British never possessed these capacities before and yet managed to deploy a 'credible' deterrent. It is not that the capabilities of the Trident are not worth while, it is a matter of how much Britain can afford. My judgement is that the British may pay more than they can, for more than they need.

If there is one feature of the strategic environment which is likely to change during the projected lifetime of the British Trident, it is the ability of anti-ballistic missile systems. With the effort that is being expended in the areas of laser and particle-beam technology and the potential of space for weapons system employment, there is perhaps greater long-term probability of a significant break-through in this area than in ASW. In the medium-term, current BMD technologies could probably be more rapidly exploited by the USSR than the United States. The ability of increasingly sophisticated and supersonic cruise missiles to penetrate Soviet defenses will likely increase at a faster rate than the effectiveness of those defenses. In either case, there

may be a slow, steady shift away from ballistic missiles toward cruise missiles in terms of strategic efficiency and political opportunity-costs. Cruise missiles have the additional advantages of accuracy, which makes them more effective and employable in strategic conventional and theater nuclear roles, and flexibility, since they can be deployed on a number of potential launch platforms as the tactical situation and strategic environment requires.

The expense of Trident will not stop with its purchase and initial deployment. It would be foolish to imagine the strategic environment remaining static for the duration of Trident's life. Updates and modernizations will be required to keep the system effective and credible, just as Chevaline was considered essential for Polaris. The costs of these will have to be borne by the British to maintain their own deterrent effectiveness. The impact these costs will continue to have on the British conventional forces will result in a lower threshold for Soviet aggression and very well might become a divisive force in the Western alliance.

The Trident I (C4) SLBM is the best missile presently available to the British, but its acquisition by them would distinctly not be the best possible strategic alternative possible. The British should explore ways of keeping their strategic deterrent force effective and reliable. New operational procedures should be considered to extend the service life of the Resolution class SSBNs, including inshore

operating patterns. Admirals Zumwalt and Bagley suggest an interesting concept when they propose SLEPing U.S. Poseidon boats as they are withdrawn from service and selling them to the British for use with either Trident I or an up-dated Polaris/Poseidon to maintain the effectiveness of the British deterrent into the 21st Century. This Service Life Extension Program (SLEP) could just as easily be carried out in British shipyards as in American and would thus help the strained British economy. [Ref. 74: p. 13]

At the same time the British could buy or work with the Americans on establishing their own cruise missile force, perhaps initially deployed in the GLCM version on trucks throughout the United Kingdom. With the continued effectiveness of the British deterrent force insured with SSBNs at sea in the 21st Century, there is time to acquire and build up the requisite skills for an indigenous cruise missile production capability which will stand both the U.S. and the British in better strategic stead as time goes on. Additionally, the costs will likely be considerably less than that demanded by the deployment of the Trident missile system as presently contemplated.

An extension of the current ballistic missile deterrent capability of the British through any of the means previously considered, combined with a directed attempt to acquire, in concert with the Americans, a realistic cruise missile force and production capacity, would provide an effective and

credible deterrent force to meet the immediate needs of the British and may prove over the long run to provide more strategic flexibility than any version of the Trident. Militarily such actions would have less impact on the conventional forces which the British deploy and which remain the first line of readiness to prevent any Soviet aggression from reaching a situation of last resort.

Politically, a combined Polaris-extension/cruise missile force is likely to create less controversy and opposition than the more costly, visible Trident. The ability to gain popular political support is the key to insuring the viability of any military weapon system chosen over its projected service life. A nuclear deterrent force is the same. If the cost is too heavy in both pounds sterling and political capital, it will not be successful. The Trident is not and Britain does not have the economic wherewithal to make it work through the decades as will the United States. The question that the British themselves must answer is whether they are in fact seeking with Trident to continue their strategic deterrent capability or buying it because it is the best. If it is the last resort capability they seek, there are better, more cost-effective ways of guaranteeing it. If it is the best they seek, Trident must be the choice. But the British face the very real prospect of failing to bring the attempt to fruition because of domestic political opposition and economic weakness. Such a choice, because

of the neglect and under-funding of the conventional forces of the three military services, will only serve to increase the likelihood of the conditions which the British strategic nuclear force is designed to deter.

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